ELECTRICITY IN THE ROGUE RIVER VALLEY

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POWER AND GAS

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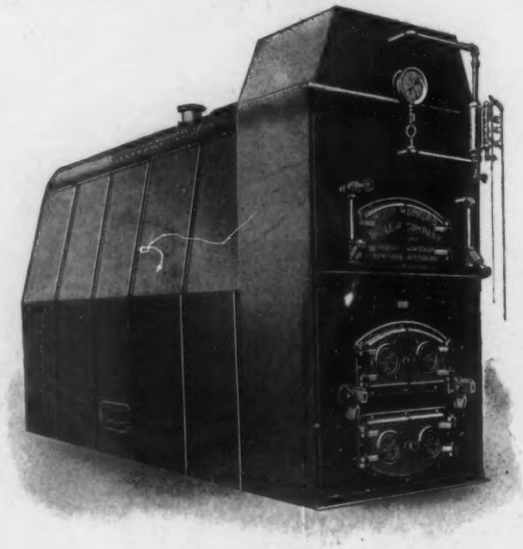

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Crater Lake, Oregon, Showing Phantom Ship.

ELECTRICITY IN THE ROGUE RIVER VALLEY.

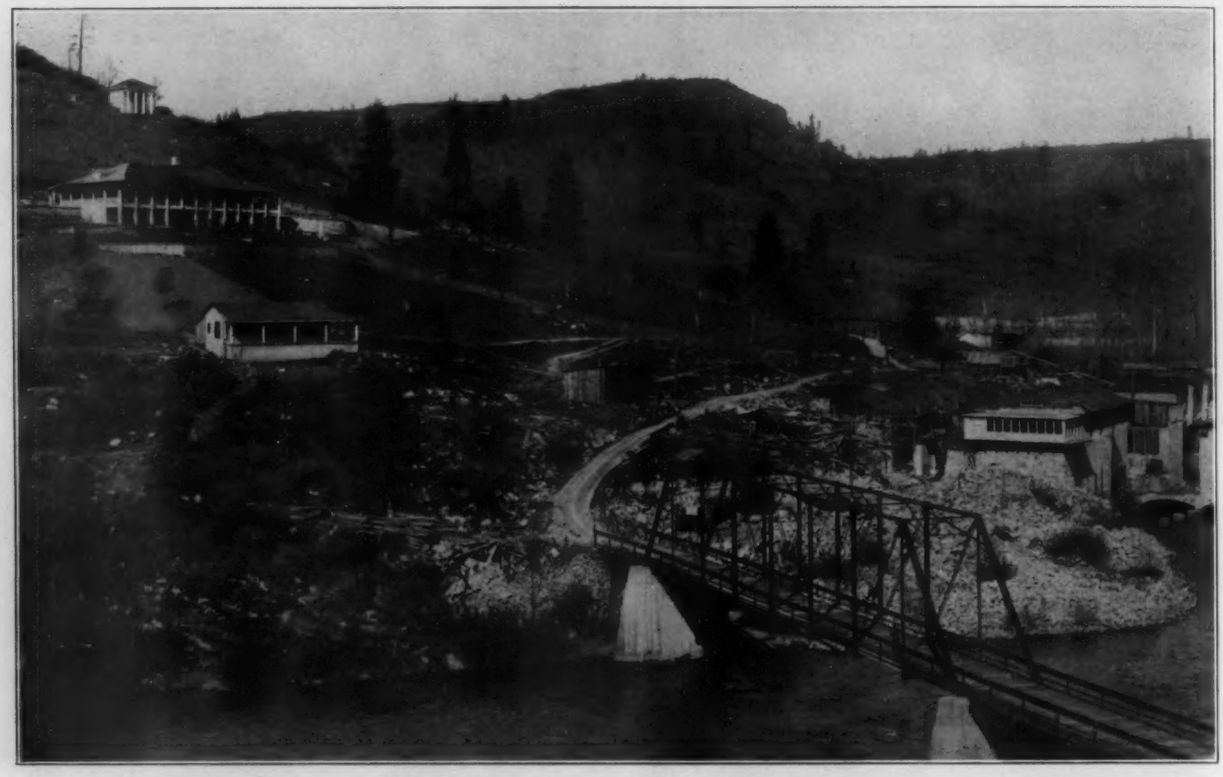
BY ARTHUR H. HALLORAN.

Jumping Salmon.

OREGON suggests apples—great, juicy, crisp, red apples. The finest of them come from the valley of the Rogue River, whose tumbling torrent heads in the high Cascades close to the blue placid waters of Crater Lake, that wierd body with its phantom ship which reincarnates the skeleton of Mazama's ancient volcano. The contrast wrought by time in quenching the misdirected energy of this youthful giant has been duplicated on a smaller scale in the history of this valley whose exuberant spirits in "the days of old, the days of gold," have been succeeded by the steady progressive spirit of horticultural success.

Gold was the lure spread by Nature to attract the hardy pioneer of the fifty's. Many stayed to enjoy the more lasting and more productive results of developing the soil. Blessed with all the bounties of Nature, a beneficent climate, a fertile soil, and beautiful scenery, this valley is already supporting 25,000 people, "and not half trying." "Apple and peach trees, fruited deep," are flanked by luscious pears, plums and cherries, with increasing acreage to vineyards. This fruit, because of fine flavor and excellent keeping qualities, commands the highest market price, so that the yearly profit often exceeds one thousand dollars per acre.

All this has been accomplished without the helping hand of irrigation, except where attention has been turned to raising melons, corn and alfalfa. The far-sighted are just realizing the wonderful possibilities of undeveloped water resources to further increase crop production. An unfailing supply of water can be pumped from wells 20 to 30 feet deep and surrounding streams, and here it is that the greatest use is to be found for the abundant hydro-electric power being generated by the Rogue River Electric Company. For eighty miles up and down the valley a net-work of wires bring the power to the work

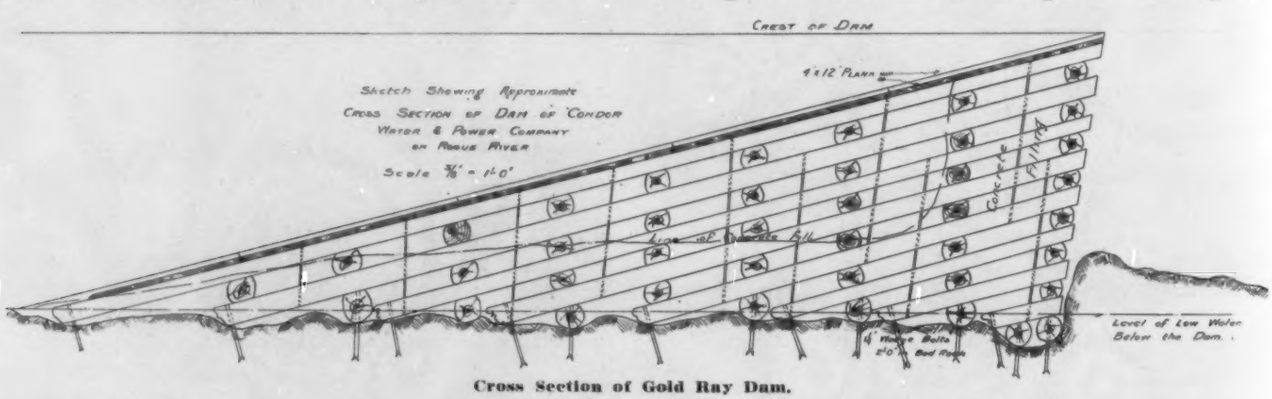


Plant Bridge at Gold Ray, Oregon.

to be done. This power, how and where generated, how and where distributed and used, it is our purpose to describe.

HYDRAULIC.

The main power plant of the Rogue River Electric Company is at Gold Ray on the bank of the Rogue River just beneath the brow of Table Rock where the Indians made their last futile stand against the white man, finally casting themselves over its great cliffs to death. Here the river has been dammed by a rock-filled timber crib with concrete core anchored to bed-rock by means of heavy steel drift-bolts



Cross Section of Gold Ray Dam.

cemented in place. The accompanying drawing shows its section. The dam is crescent shaped, arched upstream and is 420 feet long and 20 feet high, giving an effective head of the same amount to the water wheels. A granite-masonry retaining wall, 4 feet wide on top with 6 foot base, extends 300 feet up stream from the first fore-bay, forming one side of a diverting canal 60 feet wide and 12 feet deep, which carries to the turbines a fractional part of the 5,000 second feet available at times of high water.

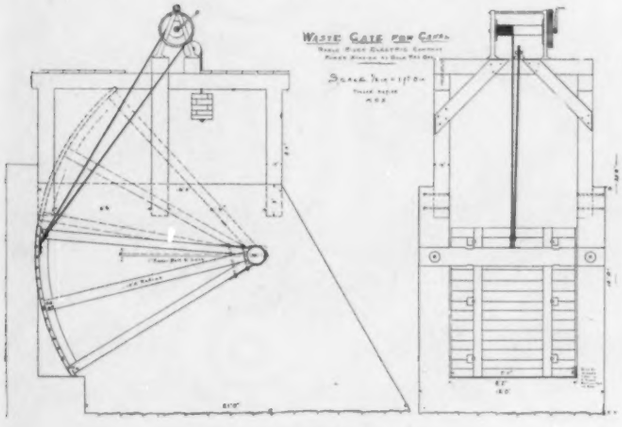
At the foot of the canal near the pen-stock approach are two waste gates to carry off flood and surplus water. One is of the usual rack and pinion type, 6 feet wide and 12 feet high, but the other is of such novel design as to merit detailed description. As shown in the drawing the face of the gate is a segment of a circle 8 feet wide and 12 feet high. Its great advantage lies in the ease with which one man can handle it, whereas the other requires several, working with crow bars. This gate was designed by Mr. H. C. Stoddard, superintendent of the plant.

GENERATION.

Motive power in the Gold Ray plant is furnished by ten McCormick water wheels, two 45-inch vertical and eight 42-inch horizontal, the latter comprising two sets of four, each set furnishing 1,000 horsepower. Water admission through wicket gates is regulated

Power Plant and Dam at Gold Ray, Oregon.

by Lombard governors. Rope drive is employed throughout. Main drive pulleys 10 feet in diameter are mounted on extensions from the horizontal water-wheel shafts. Twenty turns of 1¾-inch manila rope join with 29-foot centers the 4-foot pulleys of the generators, thus converting 145 r. p. m. of the turbines to 360 r. p. m. for the generators. Each turbine unit drives a 750-k. w. General Electric 3-phase, 60 cycle, alternator, type A T B, delivering current at 2200 volts. The generators are connected to the rope drive shaft by flexible leather couplings and are equipped with tachometers. These two units have been in continuous service since 1904.

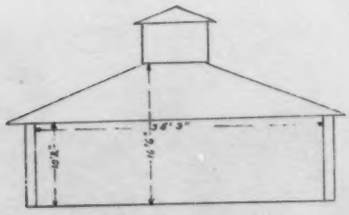


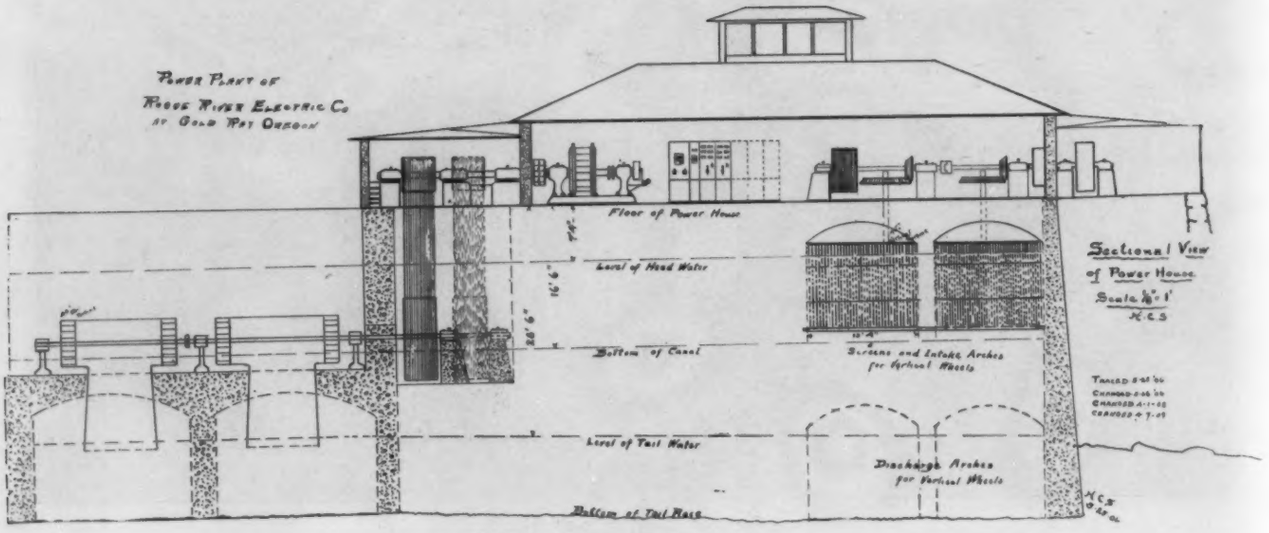
Waste Gate for Canal.

In 1908 increased current consumption made necessary the installation of a 450-k. w. generator of similar type. This is operated through rope drive and bevel mortised gears by the two vertical wheels already described. Belted to the other end of the line shaft operated by these wheels is a 10-inch two-stage Worthington centrifugal pump having a capacity of 2000 gallons per minute against a 300-foot head. This supplies water for 3000 acres of land owned by the power company, who will also sell water for irrigation to any rancher along the line desiring such service. The water is supplied through two and one-half miles of 12-inch mains and four miles of 8 and 6-inch branch lines. This system will probably be extended to the town of Central Point and outlying ranches next season.

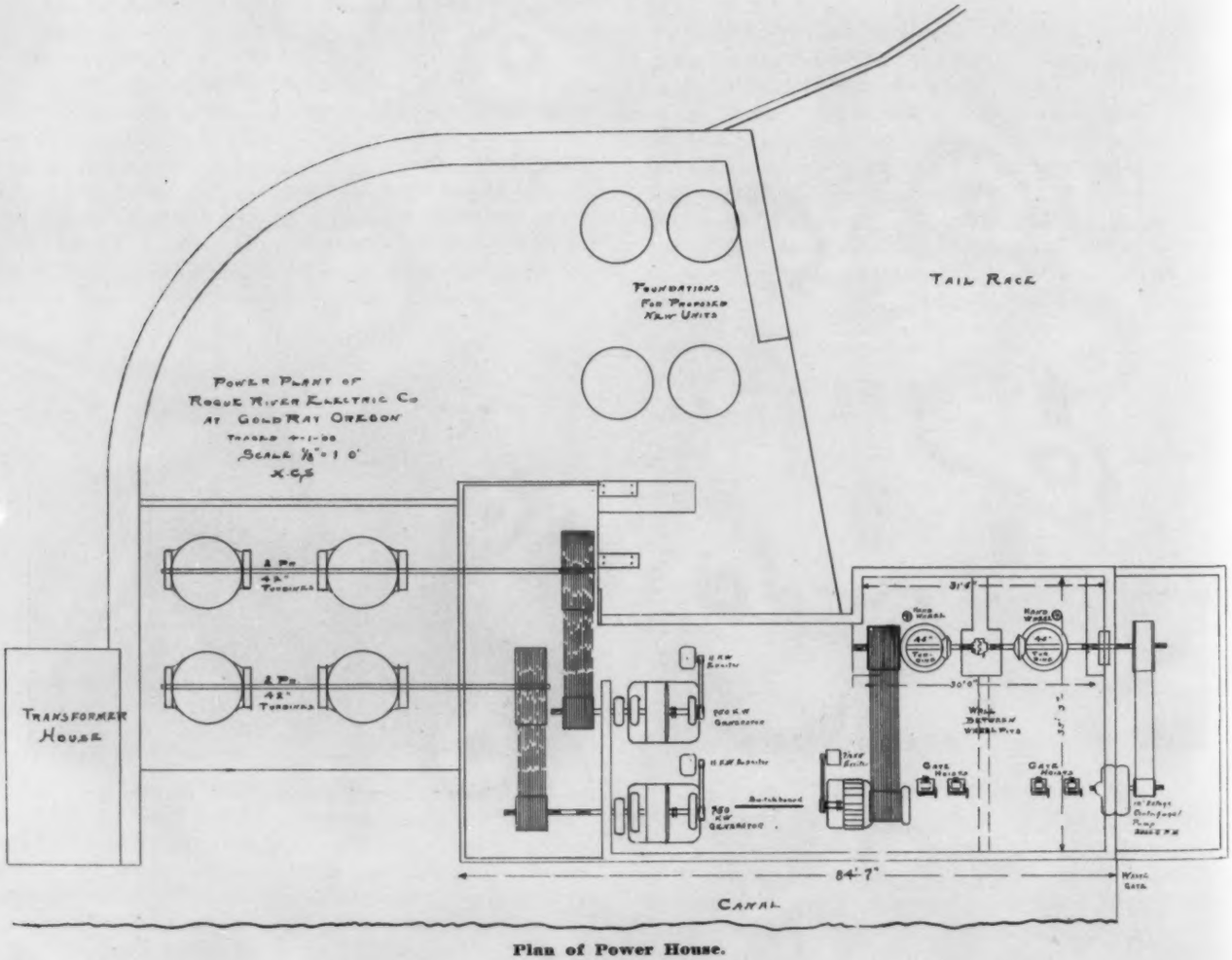
Young Orchard Near Medford, Oregon.

Current for the generator fields is furnished by belted exciters, 11 k. w. for the 750 k. w. machines and 7½ k. w. for the 450 k. w., giving a total of 1950



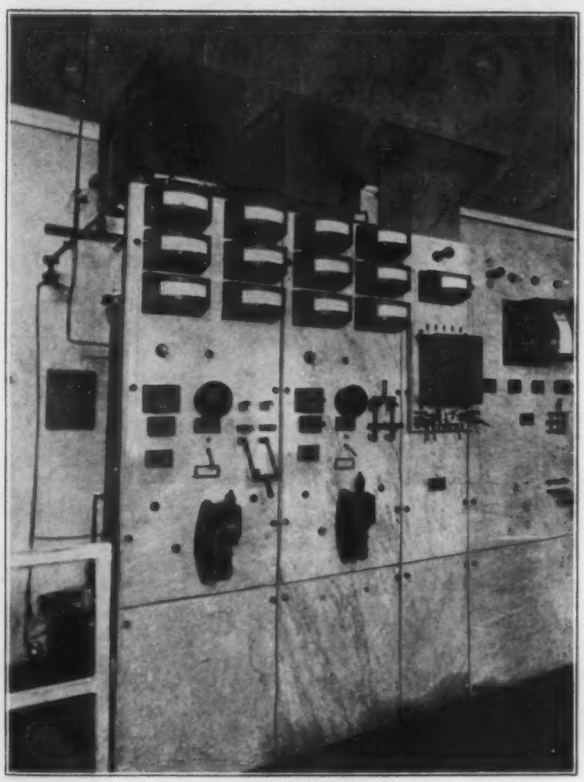


Sectional View of Power House.



Plan of Power House.

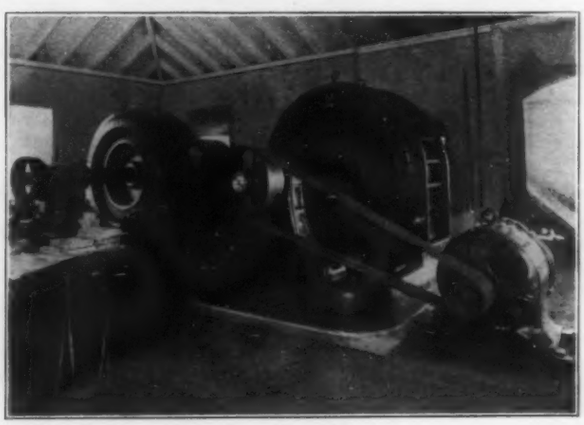
Fore Bay, Power House and Transformer House, Rogue River Electric Company.



Switchboard.

The switchboard consists of three machine panels and an exciter panel. Each of the machine panels is switches for the Lombard governors. On the exciter panel are mounted the exciter switches, volt meter, Tirrill regulator and curve-drawing volt meter, together with pilot and synchronizing lamps and a synchronizing bracket at the end of the board. All these instruments and apparatus were made by the General Electric Company.

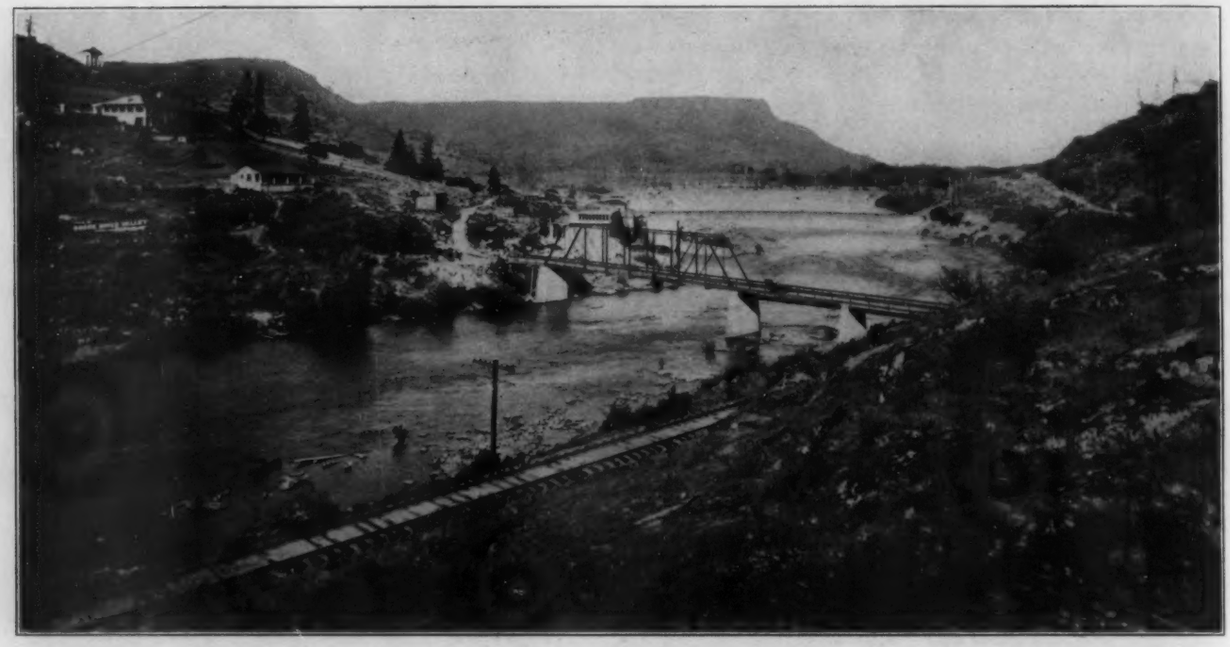
The switchboard and all machinery are so arranged that the station operator's desk commands a



Two 750 kw. Generators.

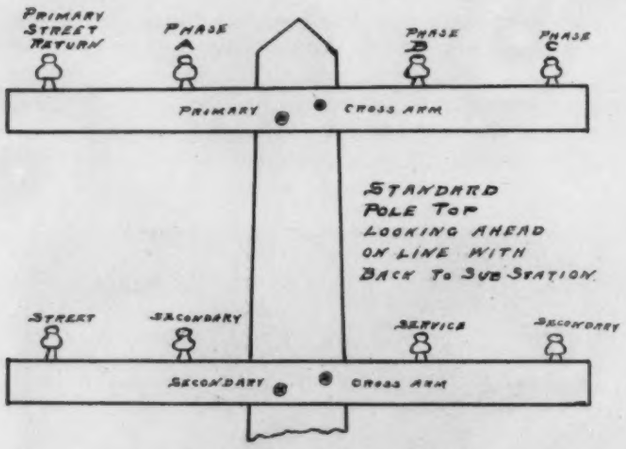
equipped with three ammeters, a watt meter, a volt meter, and field ammeter, as well as field and disconnecting switches, synchronizing plugs and control k. w., or over 2,600 horsepower. Provision has been made for two additional generators as soon as the current consumption warrants.

view of practically the entire power plant. This has an important economic bearing, for except during periods of heavy load, when the machines are to be paralleled, the entire station is operated by one man. From the switchboards two lines of lead-covered No. 0000 copper cables run to the transformer house.



Panorama at Gold Ray, Oregon, Showing Power Plant, Dam, Bridge, Club House and Employees' Residence, Belonging to the Rogue River Electric Company. Table Rock in the Distance.

This contains six 250 k. w., 2,300 to 22,500 volt step-up transformers, oil insulated and water cooled. The cooling water is furnished from a water-system which supplies the various buildings and residences on the works. There is also a small two-inch centrifugal pump which can be used to supply cooling water direct to the transformers in event of accident to the usual system.

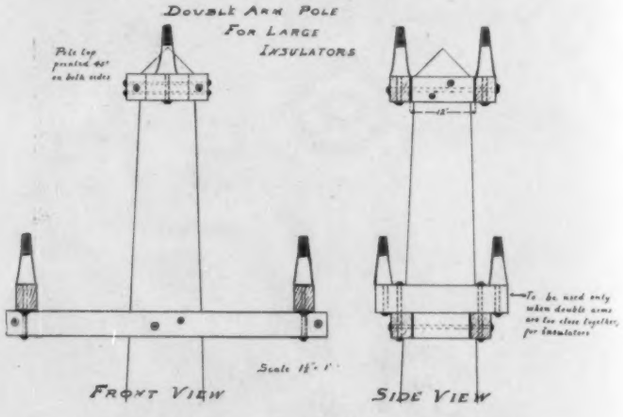


Standard Pole Top Construction.

TRANSMISSION.

From this plant a 22,500 volt transmission line extends for a total length of eighty miles to the several sub-stations. No. 1 7-strand aluminum wire is used throughout the transmission system. In the course of five years' operation there has been no shut-down due to trouble with the aluminum wire or the insulators. The three wires are spaced in a 48-inch triangle on the top of 40-foot cedar poles placed forty to the mile. The insulators are of porcelain, 9 and 11 inches, petticoat type and are fastened to the poles by means of eucalyptus pins. Referring to the map of Southern Oregon it will be seen that one line extends north from Gold Bay to Grants Pass and nearby mines, while the other extends south to Ashland through Medford and intermediate towns.

From the power plant there is a 675-foot span across the Rogue River. The river is also spanned at Rock Point and at Grants Pass, distances of 600 and 725 feet respectively. In each case the spans are supported on Locke strain insulators mounted on



Double Arm Pole for Large Insulators.

wooden towers consisting of four cedar poles placed 14 feet apart.

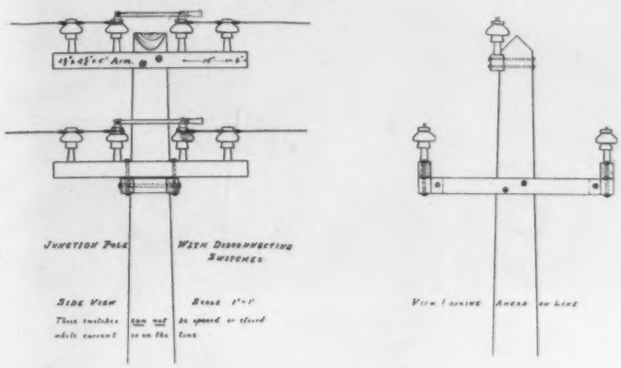
DISTRIBUTION.

Sub-stations are located at Central Point, Jacksonville, Medford, Gold Hill, Grants Pass, Ashland and Tallant. At the last two stations power is sold at wholesale to a sub-contractor owning the distributing lines and handling the retail business. In all the other localities the Rogue River Electric Company distributes and sells the current.

The standard sub-station equipment consists of three G E type H oil-cooled transformers equipped

with oil switch and ammeter on the 2,200-volt side, this being the distributing voltage. Protection is provided by a bank of General Electric 20,000-volt multigap lightning arresters and line disconnecting switches. Galvanized iron buildings house all this equipment. These sub-stations have required but little attention and are often left locked for a month at a time.

Current is distributed at 2,200 volts up to five miles from the sub-stations, extending into the country so that many ranchers can use it for lighting,

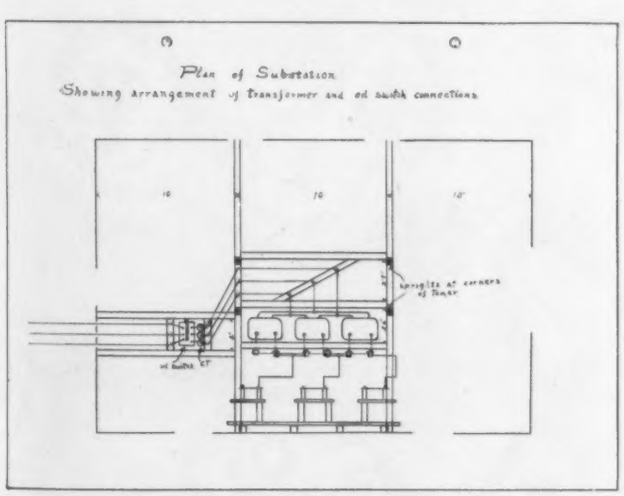


Junction Pole of Sub-Station.

pumping, sawing wood, grinding feed, etc. The power circuits are 440 volts and the lighting 110 volts, reduction being made by pole transformers.

UTILIZATION.

Nearly all power is sold on the meter basis, there being a minimum rate of $1.00 with a 25-cent meter charge. A sliding scale provides 20 kilowatts or less at 10 cents, and 2,000 kilowatts or more at 4 cents, with corresponding intermediate rates. It is stated that



Plan of Sub-Station.

almost without exception electricity is consumed for some purpose other than lighting. The company sells supplies and co-operates with the consumer in every way to give maximum results at minimum cost. Full directions are given customers so that they may check their bills. This includes an interesting summary of what 5 cents worth of electricity will do:

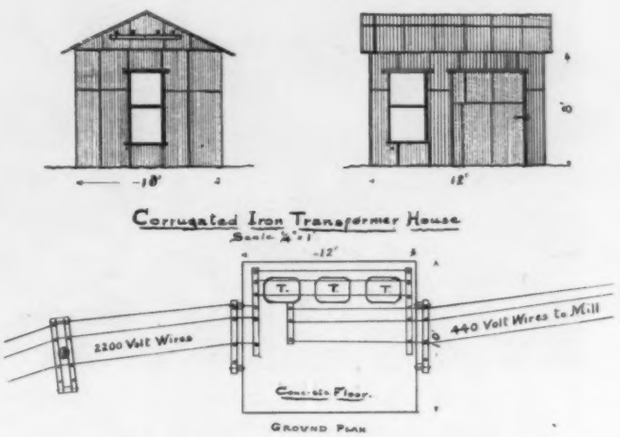
It will warm a woman's curling iron every day in the year for 3 minutes and twice on Sunday.

It will warm a man's shaving water every morning for a month.

It will fry four eggs every morning for a month.

It will boil four eggs every morning for one-half month.

It will warm your bed and prevent cold feet.



Corrugated Iron Transformer House.

It will brew the morning coffee in an average household for more than two weeks.

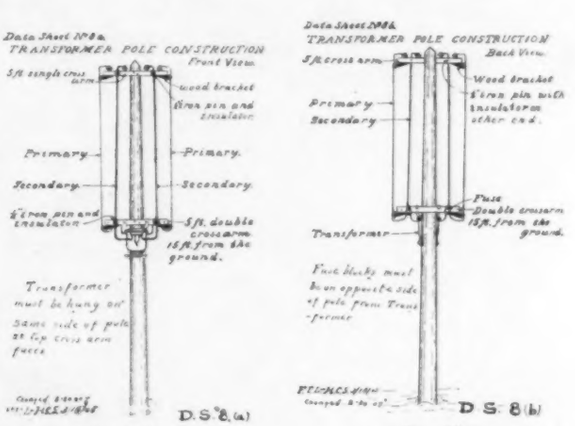
It will run a sewing machine for 21 hours.

It will do the average family ironing.

It will pump 960 gallons of water.

It will light 5 16-candle power lamps over two hours in one evening.

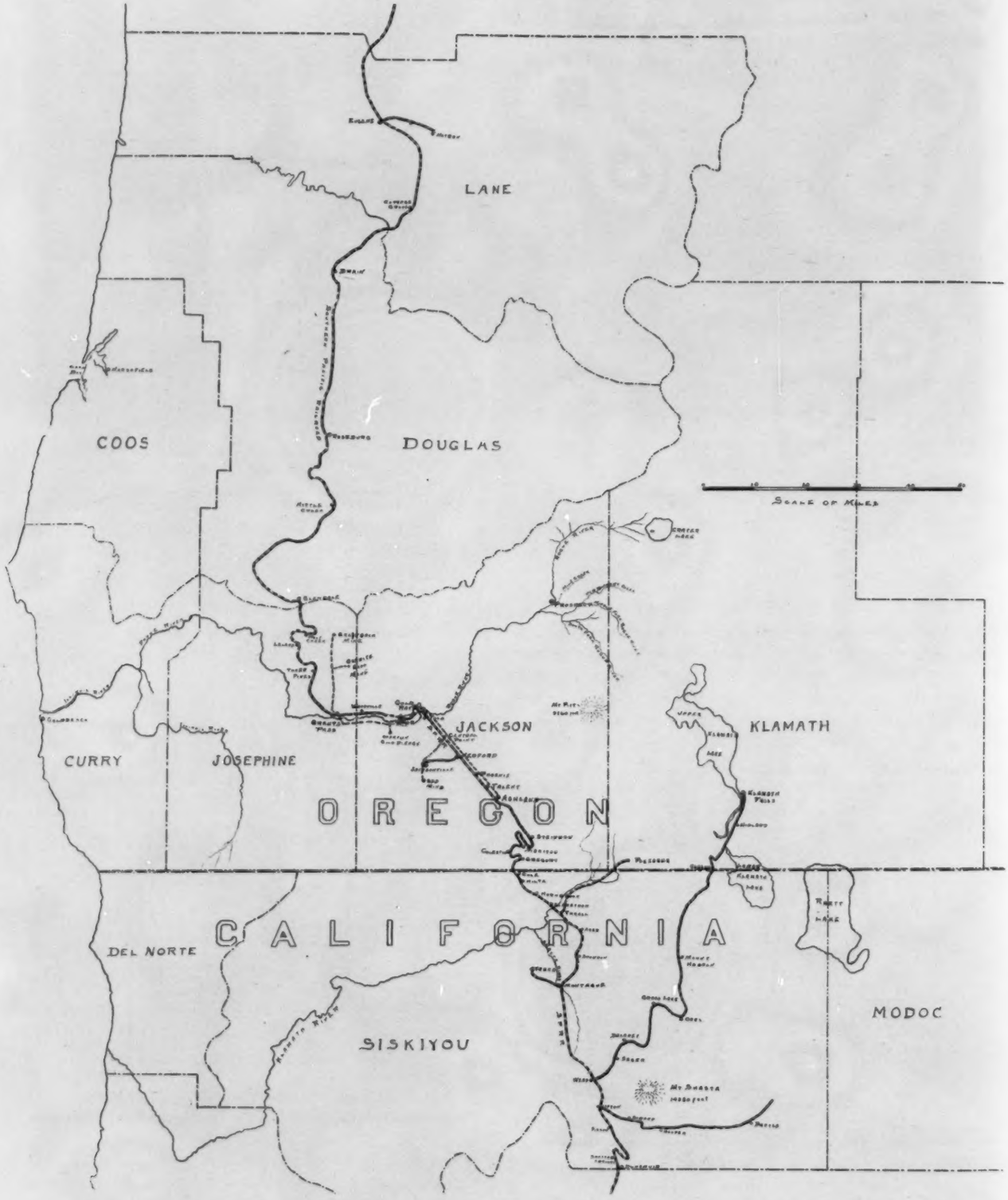
Of the 500 consumers in the town of Medford over 250 have electric irons. Many electric heating



Front View. Transformer Pole Construction.

Rear View. Transformer Pole Construction.

devices are in use and much manual labor is saved by small motor installations. Electric power is also furnished to the Champlin gold dredge at Foot's Creek, near Gold Hill, which has been in successful operation for over four years and take 300 horsepower. It is claimed that with electric power gravel running 20 cents per cubic yard can be worked at a profit and that the cost is one-half the former expense when working with wood for fuel. The Braden mine



Map of Southern Oregon and Northern California Showing Transmission Lines of Rogue River Electric Company.

Public Park at Medford, Oregon.

and 10-stamp mill at Gold Hill takes 175 horsepower and the Opp mine at Jacksonville 200 horsepower. A dipper dredge operated by the Electric Gold Dredging Company consumes 150 horsepower. Other mines such as the Greenback and Enterprise

Quartz Mill at Braden Mine.

use considerable power when operating. Electric power has made possible the working of some mines that did not pay expenses when using wood as fuel. Should development of the Blue Ledge Copper Mines, 35 miles southwest of Medford, warrant the construc-

View of Transmission Line.

tion of a smelter, it will require from 1,500 to 2,000 horsepower for operation.

The history of almost all Western mining camps

Young Orchard Belonging to Orchard Home, Tolo, Oregon. Water for Irrigation Pumped Through 12-Inch Pipe Line From Power Plant of Rogue River Electric Company.

shows that many producing mines are overlooked in the first rush for gold. Jacksonville, five miles from Medford, was the scene of Oregon's first mining excitement in 1851, and since that time has been a steady producer by placer, hydraulic and quartz mining with an aggregate production of over $20,000,000. There are also many undeveloped prospects in the vast country tributary to the Rogue River valley, and with their operation will ensue a further demand for electric power.

The three most thriving towns in the valley are Medford, Ashland and Grants Pass, as can be judged from the accompanying street scenes. Inclosed arcs light the principal streets and incandescent lamps are used in almost all the residences. The company has pushed the sale of tungsten lamps, thus lowering the peak load and keeping within transformer capacity as well as giving satisfaction to the consumers. The rich agricultural and mining districts adjoining these towns are the substantial basis upon which has been

Main Street, Medford, Oregon.

built an enduring prosperity. The equable climate has attracted a most desirable population whose permanency is insured by excellent social and educational facilities.

Southern Oregon Sugar Pine, 29 Feet in Circumference.

The general prosperity is indicated by the fact that there are over one hundred and fifty automobiles in the single town of Medford. The bank deposits per capita are stated to be higher than in any other

Sterling Hydraulic Mine Near Medford, Oregon.

section of the country, this strength being evidenced in the financial flurry of 1907 when the banks in the Rogue River Valley paid cash on demand to all depositors.

But the great, and as yet undeveloped field for power consumption lies in the application of electricity to pumping water for irrigation. Thousands of acres of the most fertile land requires but the quickening touch of dependable water to spring into bloom. Heretofore the four months' dry season has sometimes prevented the best results, especially when it has been demonstrated that crops can be doubled and even quadrupled with the aid of irrigation. An inexhaustible supply of water stands from 10 to 50 feet below the surface and electric power for pumping costs only $30 per horsepower for the irrigating season, which gives an average cost of $1.25 per acre for the season.

In the past four years the Rogue River Electric Company, under the progressive administration of Dr. C. R. Ray, president and general manager, and Mr. H. C. Stoddard, secretary and superintendent, has become an integral part of one of the most prosperous communities in the West. The company controls ample power for any possible future demand from the agricultural, mining, lumbering and industrial interests of the rapidly growing section.

OWNERSHIP OF TELEGRAPH AND TELEPHONE LINES ON THE ISTHMUS OF PANAMA.

At a meeting of the Isthmian Canal Commission at Culebra on April 24th, the chairman presented the report submitted by the committee appointed to consider all questions connected with the ownership, operation and maintenancce of the telegraph and telephone lines belonging to the Isthmian Canal Commission and the Panama Railroad Company. In accordance with the recommendation made by the committee, the following agreement between the Isthmian Canal Commission and the Panama Railroad Company was approved:

On and after May 1, 1909, the Panama Railroad Company will construct, maintain and operate all telegraph and telephone lines and equipment that may be needed in the work of the said company and of the Isthmian Canal Commission; that said company will furnish to the Isthmian Canal Commission all such telegraph and telephone service and facilities as the Commission may require, and as may be requested by officers of the Commission with the approval of the chairman and the chief engineer.

In consideration of this agreement on the part of the Panama Railroad Company, the Commission agrees to pay to said company, monthly, an amount equal to seven and a half dollars for each telephone instrument used during the preceding month or fraction thereof, and the Commission further agrees that the Panama Railroad Company shall on and after May 1, 1909, have the use without charge, of the Commission's part of the telegraph and telephone plant and equipment then owned by the Commission, and shall not be liable for deterioration or necessary changes or destruction thereof; and that on the termination of this agreement the railroad company shall pay to the Commission the value at that time, then to be agreed on, of the Commission's interest on May 1, 1909, in the plant and equipment which is turned over to the company on said date.

The Commission also agrees to pay to the railroad company the sum of $2400 per month in full payment for all services rendered by the company in maintaining extra operators, signalmen, and other employes made necessary by the operation of I. C. C. trains over the railroad company's tracks. The Commission will pay telegraph operators in its own offices as heretofore.

THE REAL PURPOSE OF THE AIR BRAKE.[1]

BY W. S. BARTHOLEMEW.

PART III.

On Plate 18 is shown the diagrams of all the stops from the different speeds and brake pipe reductions, and it will be seen that from 30 miles per hour, the stop was made in 1,700 feet with a 5-pound reduction with the improved "K" triple valves, as I have heretofore explained to you, and that to secure a similar stop with old style "H" equipment, it was necessary to make a 20-pound brake pipe reduction, and even then the stop was accomplished in but 1,725 feet.

You will appreciate that it is much easier to recharge the auxiliary reservoirs when but 5 pounds has been deducted in making a stop, as compared with the re-charge when 20 pounds has been required to make the stop or control the train. This accounts for much when handling heavy tonnage trains on grades in excess of 1½ per cent, and from the fact that trains can be controlled with such light applications with "K" triple valves comes one of the most important benefits of the improved equipment. I will show you a little later what can be accomplished in the control of trains on grades when I explain the records of demonstration as illustrated on Plate 20.

Before doing so, however, I wish to explain to you one other very important improvement in the "K" triple valve which I have not mentioned here-

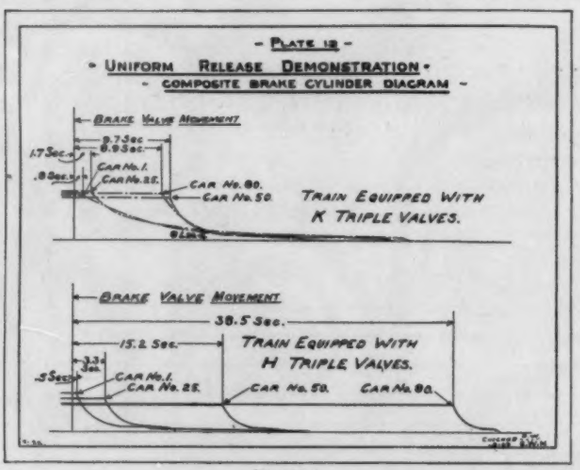


Plate 12.

tofore, as I have confined my talk up to this time to the features having to do with the application of the brakes. On Plate 12 is shown the comparative results of releasing the brakes in long trains with old style and the improved equipment. I have explained to you earlier in the talk that we knew there were shortcomings in the air brake equipment, but that, owing to the engineering difficulties involved, it was necessary to permit them to exist where unimportant, and in any event, that they were shortcomings on the release side, and that, while we might have what the train men called "stuck brakes," it was of much less importance than to have any possibility of non-application of brakes when an application was attempted. I have explained to you the results of the slack running in from the rear end of the train, due to the application of the brakes first on the head end, and, of course, just the opposite to this would be the slack running out on the head end by having the brakes released on the head cars while they were still applied on the rear end. When we now release the brakes in an 80-car train the last car does not start to release for from 14 to 40 seconds after the brakes are released on the head end, as will be seen by referring to the diagram on the bottom part of Plate 12, which illustrates the condition of brake cylinder pressure throughout the train during release and explains why the Southern Pacific, and practically every other railroad, have instructions to engineers which read something like this: After having made a brake application and the speed of train has been reduced to below 10 miles per hour do not release brakes until after the train stops. This is on account of the fact that, if the brakes were released the slack on the head end would run out, as would be indicated by the diagram, and the train probably break in two back of about the twentieth car, and the brakes on the rear end would still be fully applied.

In marked contrast to this is the diagram shown on top of Plate 12, which illustrates that, while the brakes on the head end start to release at about the same time with the improved equipment, as shown on the bottom of the plate with the old equipment, the brake cylinder pressure is not permitted to escape until the brakes on the rear end have started to release and the pressure in the rear brake cylinders has been reduced to a point where all of the brakes in the train would be releasing together uniformly. This action of the improved equipment will permit the release of brakes on freight trains at any time desired. There are many benefits which will result from this improvement. The principal one, of course, would be the reduction to shocks internally in the train, which is, of course, the primary object we are after; and the next most important would be the great saving in time, as, if a freight train could slow up and pull in on a siding, instead of completing the stop, as at present, considerable saving in time could be made each time it was necessary to head in for passing trains. This improvement we have named the "uniform release" feature, and is brought about by the triple valves, which happen to be in the head end of the train, restricting the exhaust passages by utilizing the greater differential there is in the brake pipe on the head end during release of brakes to operate the uniform release feature so that the air does not escape out of the front brake cylinders as rapidly as from those farther back in the train which have the exhaust ports fully opened.

On roads where the trains are fully equipped they will be able to withdraw the instructions to complete the stop; and I think I am safe in saying that this one feature would save the Southern Pacific company more money than any other feature; in fact, Mr. Scott and Mr. Kruttschnitt of the Southern Pacific company place it as the most important one.

On Plate 20 is shown the record of a demonstration made on Beaumont grade from Beaumont to Palm Springs, Cal., and illustrates how the improvements

[1] Part III completes Mr. Bartholemew's article on "The Real Purpose of the Air Brake, a paper read before the San Francisco section of the American Institute of Electrical Engineers, November 27th, 1908. Part I appeared in our issue of May 22nd and Part II in our issue of May 29th.

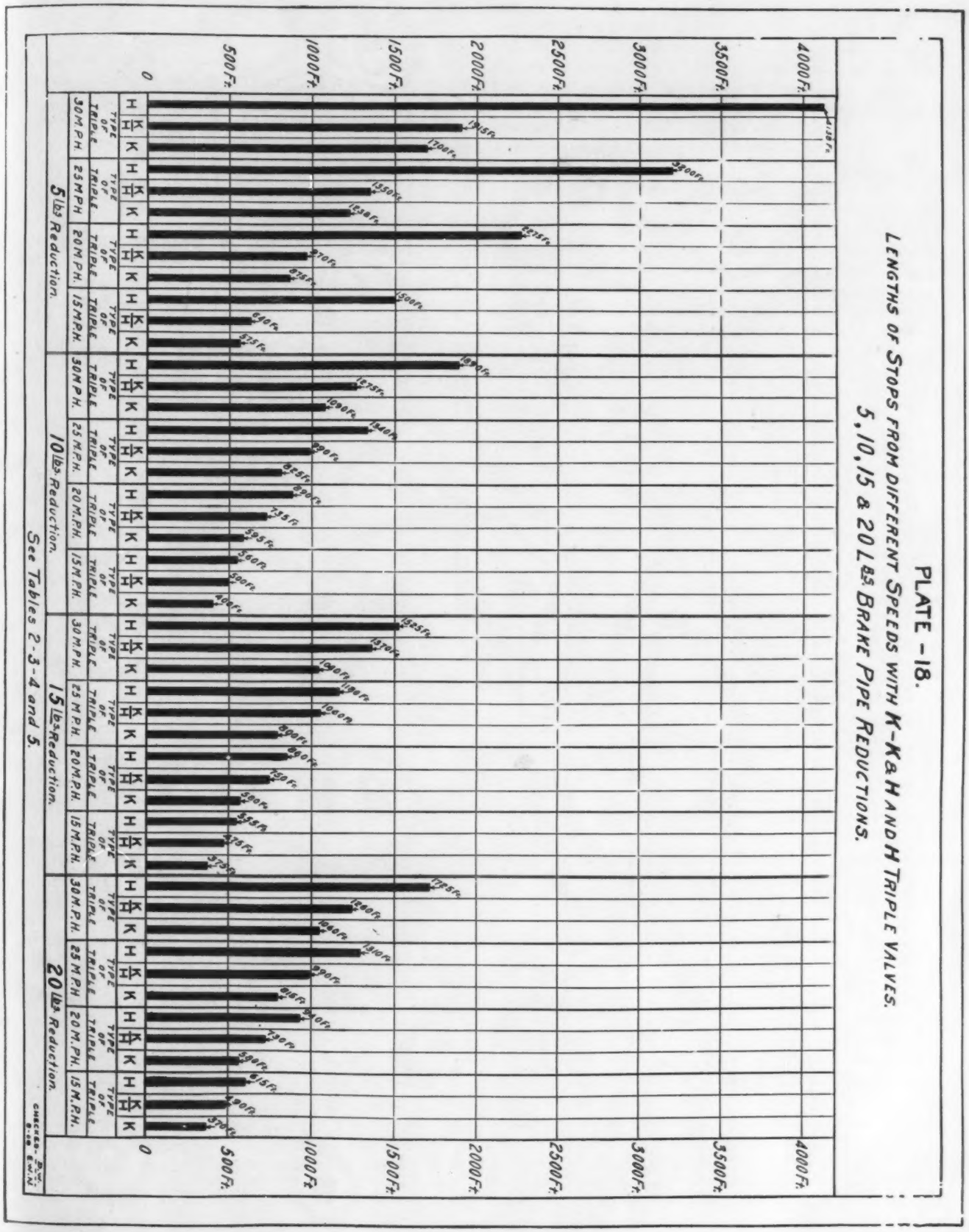


PLATE - 18.
LENGTHS OF STOPS FROM DIFFERENT SPEEDS WITH K-K & H AND H TRIPLE VALVES.
5, 10, 15 & 20 LBS. BRAKE PIPE REDUCTIONS.
0
500 Ft.
1000 Ft.
1500 Ft.
2000 Ft.
2500 Ft.
3000 Ft.
3500 Ft.
4000 Ft.
5 lbs Reduction.
10 lbs Reduction.
15 lbs Reduction.
20 lbs Reduction.
See Tables 2-3-4 and 5.
30 M.P.H.
25 M.P.H.
20 M.P.H.
15 M.P.H.
TYPE OF TRIPLE
H
K-H
K
1138 Ft.
1815 Ft.
1700 Ft.
3800 Ft.
1950 Ft.
1638 Ft.
2275 Ft.
970 Ft.
875 Ft.
1500 Ft.
640 Ft.
575 Ft.
1890 Ft.
1675 Ft.
1090 Ft.
1540 Ft.
990 Ft.
875 Ft.
990 Ft.
735 Ft.
595 Ft.
560 Ft.
590 Ft.
490 Ft.
1925 Ft.
1370 Ft.
1090 Ft.
1190 Ft.
1020 Ft.
890 Ft.
890 Ft.
750 Ft.
590 Ft.
555 Ft.
575 Ft.
375 Ft.
1925 Ft.
1260 Ft.
1080 Ft.
1310 Ft.
990 Ft.
815 Ft.
940 Ft.
790 Ft.
590 Ft.
615 Ft.
490 Ft.
370 Ft.

in the new triple valve can be reduced to dollars and cents. This chart shows the use of the equipment in handling tonnage, which, as I stated earlier in the evening, is the primary reason for the application of air brakes to freight trains today. The Southern Pacific company, and, by the way, they are almost unique in that, have a very sane and safe train and tonnage limit on all of their grades. The average person, and perhaps you all think that the tonnage which can be hauled up hill would be what limited the carrying capacity of a single track division, but it is not; it is the tonnage that we can control down hill which sets the limit.

This particular grade, which is from Beaumont to Palm Springs in Southern California, being the slope down into the Salton Basin, is about 26 miles long and nearly 2 per cent gradient the entire distance, with only moderate curvature. Reading from the bottom of the chart up are shown the mile posts, the curvature of the track, profile from Beaumont to Palm Springs with per cent of gradient at frequent intervals, speed of train in miles per hour, time brakes were applied and released, brake cylinder pressure on last car, amount in pounds of each brake pipe reduction, serial number for identification of each brake application, auxiliary reservoir pressure on last car, main reservoir pressure, the present rating by the Southern Pacific company of this grade, the tonnage handled in this demonstration in the different zones, and the time each mile post was passed.

The tonnage rating for this grade is a maximum of 4,000 M's for the weight of the train back of the locomotive and this tonnage must be distributed so that each operative brake shall not be required to control more than 110 M's.

This chart has been arranged particularly to permit observation comparatively of the points brought out in the demonstration, which, in the order of their importance, are the total tonnage handled in the different zones, the M's per brake, the maintenance of the auxiliary reservoir pressures throughout the run, the light average brake pipe reductions needed to control the train and the perfect control of train as indicated by the speed diagram near the bottom of the chart. It will be seen that the brakes were off more than they were on, and at no time was there an indication of using any of the ample reserved stored volume. This run had been preceded, of course, by other runs in which the normal tonnage had been handled to determine what safety reserve there was in the improved equipment when handling normal tonnage, so that this run was started with a maximum tonnage of 167.5 M's per good brake, and when it was discovered that the train could be controlled with light applications even with this high average, the tonnage was increased to 177.5 M's per good brake by cutting out some of the operative brakes, and during the latter part of the run the tonnage was still further increased to 182.8 M's per good brake, being the maximum handled, and it will be noted that the auxiliary reservoir pressure maintenance was still normal, with the speed of train not exceeding 16 miles per hour on the straightest part of the grade from which no benefit was secured in retardation from wheel flanging.

It was not necessary, of course, to handle such excessive tonnage in M's per brake, but as the Southern Pacific company has oil cars, which, when loaded, weigh 150 M's each, it was desired to demonstrate the fact that solid oil trains could be handled even with some defective air brake equipment which might naturally occur in daily service, which, of course, might make it necessary to handle similar tonnage in M's per brake to that used in this demonstration.

The control of the train at the speeds indicated, and with the normally light brake applications and with brakes applied less than 40 per cent of the time, satisfactorily indicates the great benefits which come from the complete serial action of the brakes from light applications occurring throughout the train in less than one-half the time and with more uniformity than with old style equipment.

Heretofore, the front brakes in the train have been required to do most of the work, causing excessive wheel heating; whereas, in the demonstration illustrated in Plate 20, the wheel heating was very uniform throughout on account of the even distribution of the braking effort, as might be expected from what I have explained to you as being shown in the other diagrams earlier in the evening.

The fact that tonnage can be handled on such grades as Beaumont hill, of 182.8 M's per good brake, as against the standard rating of 110 M's per brake, illustrates how air brake improvements can be reduced by the railroad companies to actual monetary considerations, without regard to the value in other respects of the improved factor of safety.

I wish to say, also, that the Westinghouse Air Brake company and other companies have been accused many times of endeavoring to influence legislation in regard to safety appliances, but I think I have made it quite clear this evening that operating conditions are usually ahead of the development of the air brake apparatus and that, instead of being apt to influence legislation, we would more naturally be on the other side of the question, as any rulings of the interstate commerce commission which requires more brakes to be operated in the train makes such severe demands upon the equipment that our development department is busy keeping up with the requirements so that our air brake equipment may meet the conditions, especially in the service application of brakes.

You will readily appreciate, from what I have said, that the conditions which made the new improvements necessary, were mainly the fact that the air brake requirements are more than four times as severe, as far as the serial action is concerned, when we are obliged to operate 100 per cent of the brakes in the train, as against former rulings that 50 per cent of the cars should be equipped and 50 per cent operated. In other words—it is not long since that a 100-car train might have but 25 brakes on the head end actually operated; whereas, today the tendency is toward having 100 brakes in actual operation on 100-car trains.

I have not said much to you about the improved air brakes for passenger trains, which were also demonstrated this summer, but, as the time is growing late, I think it will be impossible to cover the passenger brake situation this evening.

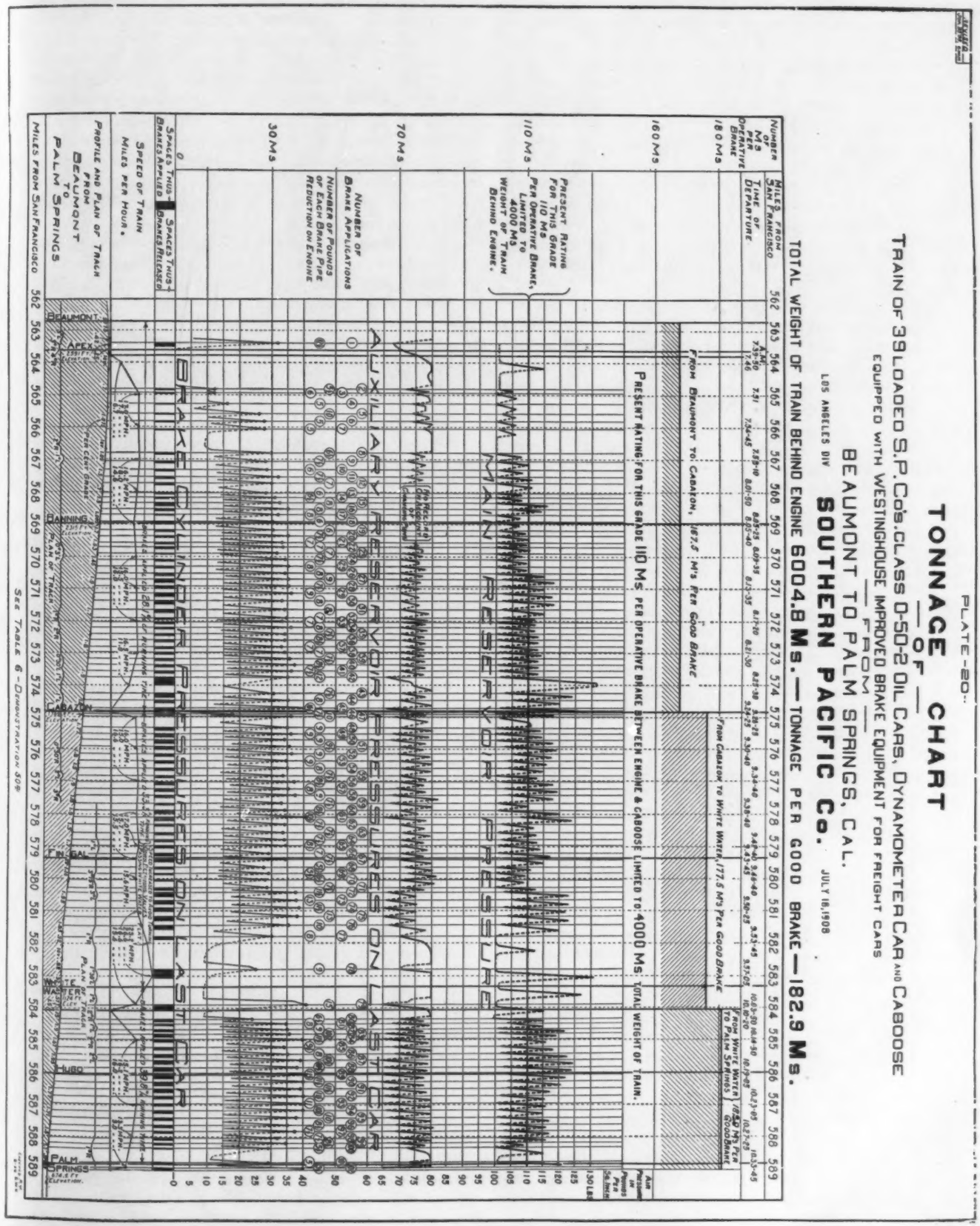


PLATE-20.
TONNAGE CHART
OF
TRAIN OF 39 LOADED S.P. Co's. CLASS D-50-2 OIL CARS, DYNAMOMETER CAR AND CABOOSE
EQUIPPED WITH WESTINGHOUSE IMPROVED BRAKE EQUIPMENT FOR FREIGHT CARS
FROM
BEAUMONT TO PALM SPRINGS, CAL.
LOS ANGELES DIV SOUTHERN PACIFIC Co. JULY 16, 1908
TOTAL WEIGHT OF TRAIN BEHIND ENGINE 6004.8 Ms. — TONNAGE PER GOOD BRAKE — 182.9 Ms.
Number Ms per Operative Brake
180 Ms
160 Ms
110 Ms
70 Ms
30 Ms
0
Miles from San Francisco
Time of Departure
From Beaumont to Cabazon, 187.5 Ms Per Good Brake
From Cabazon to White Water, 177.5 Ms Per Good Brake
To Palm Springs, 182.9 Ms Per Good Brake
Present Rating for This Grade 110 Ms per Operative Brake between Engine & Caboose Limited to 4000 Ms
Total Weight of Train.
Present Rating For This Grade 110 Ms Per Operative Brake, Limited to 4000 Ms Weight of Train Behind Engine.
Number of Brake Applications
Number of Pounds of Each Brake Pipe Reduction on Engine
Auxiliary Reservoir Pressure
Main Reservoir Pressure
Brake Cylinder Pressure on Last Car
Spaces Thus Brakes Applied
Spaces Thus Brakes Released
Speed of Train Miles per Hour.
Profile and Plan of Track from Beaumont to Palm Springs
Miles from San Francisco
Beaumont
Apex
Banning
Cabazon
White Waters
Palm Springs
See Table 6 - Demonstration 30

We might take a look at Plate 32, however, which represents a pair of stops made with the improved and with old style air brake equipment on an 8-car train in the demonstrations on the Hayward branch of the Southern Pacific. The trains were accelerated to about 70 miles per hour and the stops shown on the chart were made from as nearly similar speeds as possible. The train was so equipped with both types of apparatus that a run could be made with one style of equipment and immediately followed by the other, as the change could be made by simply re-arranging the cut-out cocks. It will be noted that with the same pressure and from approximately the same speeds, the stop was made in 1,673 feet with the improved equipment, as against 2,037 feet with the present type of high speed air brake apparatus.

The primary object of the improvement in air brakes for passenger trains is, of course, to improve the factor of safety, but, if I had time, I could explain to you other considerations in the matter of flexibility which it is now possible to add to the air brake equipment for passenger trains, because the five limiting conditions which I mentioned earlier in the evening, are not so rigid as applied to air brakes for passenger trains, as there is not so much foreign car interchange. The Pullman cars being equipped with the improved brakes and constituting most of the foreign cars in the trains, makes it possible to depart somewhat from former standards.

The saving in distance of the stop by the improved equipment, as shown on the diagram on Plate 32, illustrates that the train with the old style equipment would be going approximately 32 miles per hour, while the train with the new equipment would be at rest, meaning that there would be about 35,000,000 feet pounds of energy remaining in the train still moving, as against the train being at rest with no collision energy, with the improved equipment.

I wish to say in closing that, in all the years we have been in the air brake business, and, of course, been making demonstrations in different parts of the country, we have never had the equipment to use, or the conditions so perfect or the general air brake requirements so exacting as we have had in California this summer. The equipment furnished us by the Southern Pacific being practically perfect for our requirements, and the use of oil burning locomotives in our demonstration, made it possible to carry out a program in a way that was new to us. Heretofore, when we have attempted to accelerate freight and passenger trains to certain speeds in miles per hour, it has been very difficult to secure uniformity on account of difficulty in getting coal burning engines to stand the strain of maximum speeds, but with engine No. 2765, for instance, which is one of the heaviest Southern Pacific freight locomotives, we never lacked for steam during our demonstration, as, with oil for fuel, it was possible for the fireman to keep the steam at the pre-determined pressure from the beginning to the end of the demonstration. Also in our passenger runs, we could get the maximum out of the locomotive every time.

Our committee also had never experienced such uniform climatic conditions as during our stay in Southern California. The temperature, humidity and general conditions affecting the track were almost absolutely uniform from day to day throughout the entire period. The rolling stock of all kinds used in our demonstration could not be improved upon, and we, of course, have the Southern Pacific officials to thank, not only for the satisfactory equipment given us to work with, but for the hearty co-operation they favored us with throughout the entire summer, placing every facility in our hands, not only for making the demonstrations, but in working up the data secured, as illustrated by the charts, some of which I have explained to you here in my talk this evening. I thank you very much.

Mr. Babcock: Gentlemen, I think we can all say that we have been very fortunate in having this kind of a talk; and, inasmuch as the hour is late, I think we had better confine our discussion to such questions as some members might ask. Is there anybody that can suggest some questions? There does not appear to be anybody with any questions. Mr. Newell, would you like to contribute to the evening's entertainment?

Mr. Newell: I think the subject has been so well and entirely covered by Mr. Bartholomew that it is not necessary for me to add anything.

Mr. Babcock: Mr. Newell was with Mr. Bartholomew in charge of the scientific part of the demonstrations.

There is one point that came to me. I have had great trouble in getting manufacturers to depart from the manufacturers' standard, and it gives me great pleasure to see a manufacturer run up against the standards in the hands of the customer.

Mr. Bartholomew: It is the purchasers' standards that limit us.

Mr. Babcock: My experience has been confined to the standards of manufacturers. The subject of air brakes became very interesting to me once—in this way: I was on a foreign road going down grade, and it was dark and raining. I noticed that the train was actually gaining speed and the gauges showed very clearly what was going on. I found that the engineer was gradually losing his air, and the train was absolutely getting beyond control. The point as to where the equalization was going to take place became very interesting. I sent for the train conductor and asked him what he thought of the indications as shown by the different brake gauges. He smiled very broadly and said that was the way they always ran down that hill, but they were pretty near the bottom then.

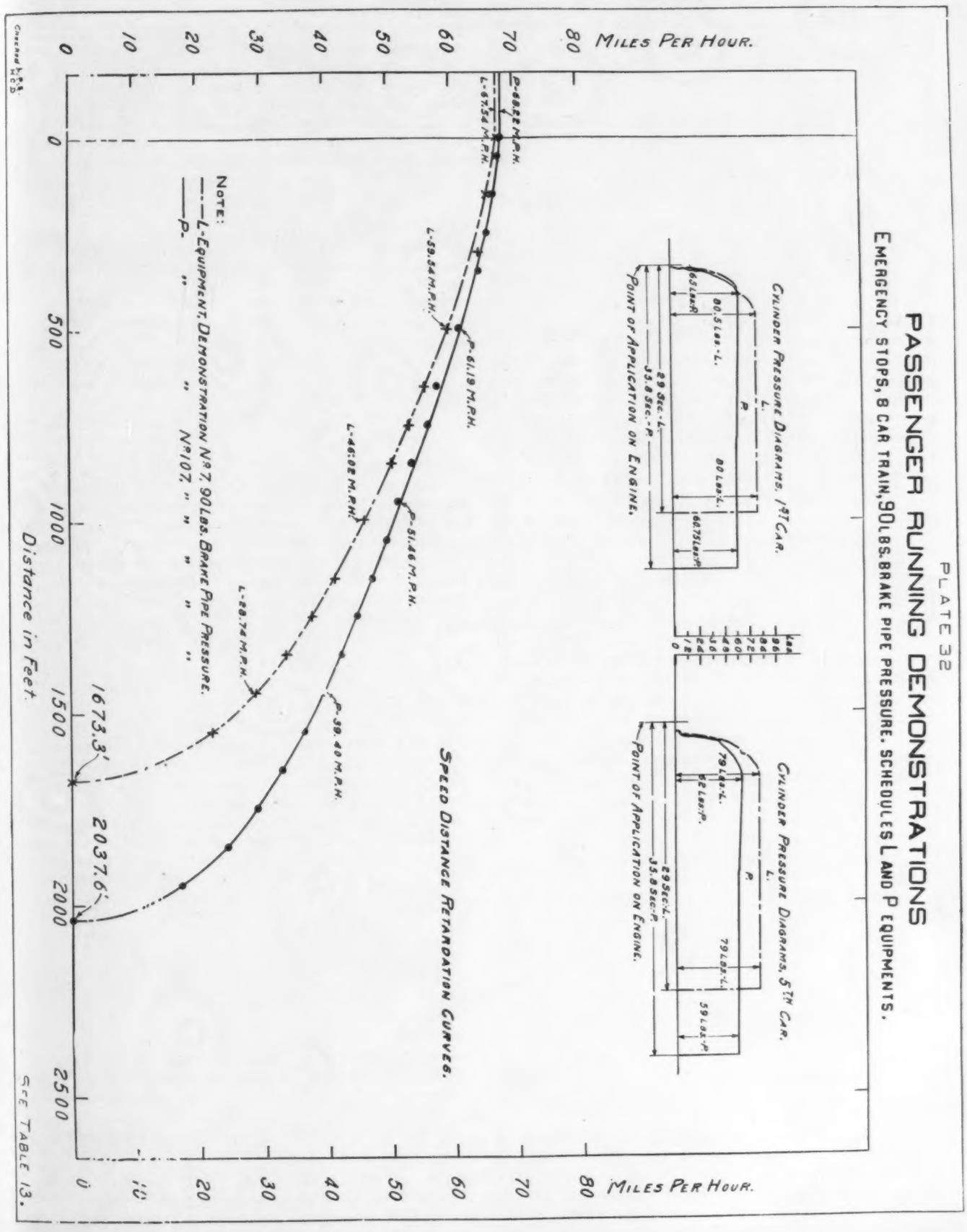
Mr. Bartholomew: I want to say that the time of re-charge at the rate of a pound a second is the thing that has limited, I might say, the factor of safety of the brake on passenger trains.

In the passenger equipment, I could not fully cover that part of the demonstration on account of the lateness of the hour—one of the important features of the improved equipment is that the pressure is restored in the auxiliaries at the rate at which it escapes out of the brake cylinder; so that if the brakes had been fully released, the pressure would have been fully restored. In the case Mr. Babcock speaks of, the engineer had made brake applications faster than

PLATE 32

PASSENGER RUNNING DEMONSTRATIONS

EMERGENCY STOPS, 8 CAR TRAIN, 90 LBS. BRAKE PIPE PRESSURE. SCHEDULES L AND P EQUIPMENTS.



re-charge could take place with the old style equipment. The re-charge improvement in passenger brakes is probably the most important development in the passenger triple valve, which, as I explained to you, is a departure from the standard and has features injected into it by the necessity of our passenger service which are not in the freight trains, but particularly to serve where we have to make application more rapidly than under the old conditions, and to secure shorter stops in emergency.

Mr. Babcock: I think we owe Mr. Bartholomew very sincere thanks for appearing here tonight. In the absence of any desire to question him, perhaps the meeting had better adjourn.

Mr. Hunt: Before the meeting adjourns I want to express the thanks of the executive committee for the attendance which has been given by the various members.

FOREST PRESERVATION IN CALIFORNIA.

California took another step in its effort to promote the practice of forestry within the State when Governor Gillett signed the bill providing for the creation of county boards of forestry. This bill authorizes the county supervisors to appoint a Board of Forestry, whose secretary shall be a trained forester. Such forester shall have power to enforce the provisions of the Act, and all lawful orders of the Forestry Board, and in addition is vested with the powers of a peace officer to make arrests for violation of the law.

The County Board of Forestry is granted exclusive power to decide upon the variety, character and kind of trees, hedges and shrubs that shall be planted upon county roads, highways, grounds and property, and to determine all questions respecting the pruning, cutting and removal of all trees, hedges and shrubs, and the extent and manner in which such work shall be done.

A violation of any of the provisions of the Act shall be deemed a misdemeanor. A special fund was also created to be made up of any penalties incurred through a violation of the provisions of the Act, and all moneys thus received shall be available to cover the expenses of the Board.

This law was the direct result of the work accomplished by Riverside County, which has for some time maintained a paid forester to look after the setting out and caring for trees within the county. The results obtained in that county were so satisfactory that it was thought desirable to extend the scope of the work to other localities.

NEW BURGLAR ALARM.

Deputy Consul General Ulysses J. Bywater reports that a Dresden engineer has invented a simple appliance for giving warning of attempted burglary or forcible entry into premises, which is thus described by the consular officer:

This appliance has been thoroughly tested by the police authorities of Dresden and Berlin, and the most experienced criminal experts were unable to find flaws in the apparatus, or to enter into the protected premises without starting the alarm. The appliance itself is very simple, consisting of a curtain or portiere, wired with fine conductors. At certain places on the curtain are affixed small metal knobs, which are connected with the wire conductors. The curtain is then drawn across the window or door, or around the safe, and the slightest disturbance of this position immediately breaks the circuit, as the metal knobs are thrown out of contact with each other.

Should the burglar notice the wires and cut one or several thereof, the breaking of the circuit would also start the alarm. Any other attempt to destroy the protecting curtain would also be noticed. Any curtain, unless made of fireproof material, would also act as a fire alarm. The alarm itself may consist of a series of bells, lights, or other electrical appliances. This invention can be used to protect doors, windows, safes, etc., and naturally the curtains, forming the most conspicuous part of the device, can be designed and arranged to suit individual taste. The inventor recently gave the writer an exhibition of the working of the apparatus, and the impression was that this invention is unique in simplicity and reliance.

PLANS TO INTRODUCE WIRELESS IN CHINA.

Consul Wilbur T. Gracey sends from Tsingtau, the following note in regard to the plan for using wireless telegraphy in China:

The acting president of the board of communications has sent an order to the telegraph administration in Shanghai directing it to obtain from foreign firms tenders for wireless telegraphic installations which the government desires to establish between the Altai Mountains and Ahsien in the northwest of Chinese Turkestan. The question of a wireless telegraph installation in the interior was pointed out by the administration as one of the most important needs of China today. It is said the board considers it practically impossible to establish the ordinary land lines across the great deserts between Peking and the extreme northwest, but the natural difficulties could be surmounted by the use of wireless. Balkson's system is considered by the board to be the newest and most efficient, and the administration was intructed to make the necessary inquiries, and were also given a list of questions as to the technical matters which it was their business to answer.

IMPORTANT TRANSFER OF WATER POWER.

The largest deal in water rights ever made in Shasta County was consummated in Redding, Cal., recently, and the deeds of transfer were placed on record.

A sum between $75,000 and $100,000 was involved in the transaction by which the Sacramento Valley Power Company acquired real estate and water rights on North Battle Creek from J. M. Cunningham, R. P. Cunningham, J. Johnson, J. W. Dailey, Joel Cunningham and J. D. and J. W. Ogburn. These are pioneer farmers of the Shingletown region, and the water rights disposed of are among the oldest in the county.

The water acquired by the Sacramento Valley Power Company constituted only a portion of the water of North Battle Creek that is to be used in developing electrical power in the southeastern part of the county.

North Battle Creek is the stream on which the Northern California Power Company's power plants, Kilarc excepted, are located. The water rights acquired by the Sacramento Valley Power Company are the oldest and best on North Battle Creek and the water has hitherto been used exclusively for irrigating purposes.

The Sacramento Valley Power Company is a consolidation of the Northern Light and Power Company and the Shasta Power Company. The first owned a power plant on South Cow Creek, 20 miles east of Redding. The second owned a plant on Snow Creek, 28 miles east of Redding.

The consolidated company's plants have a generating capacity of 3600 horsepower.

CURRENT COMMENT

Concrete railway ties have been found a success in Italy. The first lot of 300,000 proved so satisfactory that another similar lot has been ordered. They are offered for sale at $1.48 each.

Concrete covered with sea water for one hundred years was recently removed in the harbor at Brest, France. Iron bars embedded in the concrete did not show the least indication of rust, showing that concrete is a perfect preservative of iron, even when placed under sea water.

Asbestos is finding a new field as a result of improved construction of electric railways. The need of an insulating material less brittle than glass and porcelain and more durable than rubber, has led to the adoption of new compositions which, with asbestos as the base, possess both tensile strength anr heat-resisting properties.

A new type taxi-cab, steam-driven with oil fuel, will shortly be seen running in London. Outwardly the vehicle resembles the standard type of motor-cab, but in place of the motor there is a three-cylinder vertical steam engine fitted, the generator and condenser being under the bonnet. A single lever on the steering wheel controls both speed and generation.

The relations of the Forest Service to miners has been productive of much friction. Following numerous protests made by the miners, the American Mining Congress appointed a committee to confer with Gifford Pinchot, Chief Forester. Two conferences were held, on March 15th and March 18th, of this year. The outcome of the action of the latter is set forth in a letter just received by the Mining Congress from Mr. Pinchot. Mr. Pinchot states that efforts will be made to develop a plan whereby the restrictions of the Forest Service will cause no injustice to any mining man.

A singular line of investigation is being pursued by Dr. F. Peterson, Professor of Psychiatry at Columbia University, and Dr. Jung of Zurich. It appears that if a weak electric current is passed through a person's body from hand to hand, with a reflecting galvanometer in the circuit, any emotion experienced by the subject is at once indicated by a change in the conductivity of the tissues, and a corresponding displacement of the spot of light. This phenomenon, it is said, can be utilized in the detection of crime, to test the validity of evidence, or to identify from a number of suspected persons the guilty one.

The total cost of buildings erected in the principal cities of the United States in 1908 was $546,467,390, according to Jefferson Middleton, of the United State Geological Survey. New York ranked first, the cost of its buildings exceeding those of its closest competitor, Chicago, by $50,584,582, or more than 75 per cent. If the cost of operations in Brooklyn, the third city in rank, is added to that of New York, the total will be $163,684,622, or 30 per cent of the cost of the building operations in 49 cities. San Francisco is fourth in rank, Philadelphia is fifth, and St. Louis is sixth. Seventh in rank is Seattle, which spent more for buildings in 1908 than Pittsburg, which was eighth, or Boston, which was ninth.

London's latest electric railway—the suburban line of the London, Brighton & South Coast Railway, between Victoria Station and London Bridge, by way of East Brixton, has just been opened. It represents electrification of a steam railway and competition with electric street railways and motor omnibuses. It also represents 23 miles of single track. The cars are of the corridor type with separate compartments, unlike the type of long open coaches so generally familiar on electric railways. The engineering work of the line has been difficult by reason of the maze of crossings at the two termini and the low bridges on the route under which the trolley has to pass.

An eleven-million-dollar building is under construction for a retail dry goods company in New York City. The building will be completed and the store opened before autumn of next year. It will have more than 1,000,000 feet of floor space and will cost about $11,000,000, including the site. It is announced that 24,000,000 pounds of structural steel will be used, 120,000 cubic yards of earth and rock excavated, and the two acres of glass will be used for the windows. Twenty-four hundred steel columns will support the weight, and there will be 914 feet of show windows. Fifty electric elevators will be housed in a mile and a half of shafts, and the boilers will develop 4000 horsepower. The electrical work will require 240,000 feet of wire.

A new musical instrument operated by electricity has lately made its first public appearance in Boston at a concert, in which the Boston Symphony Orchestra also took part. The new device is called the Choralcelo, and its essential peculiarity consists of the vibration of piano wires by electromagnets, resulting in the production of tones of surpassing purity, if the judgment of those who have heard the instrument is to be credited. The working parts of the instrument are housed in a case resembling that of a rather large upright piano, and the instrument may be played as a piano by the ordinary percussion hammers and keys, either separately or at the same time, with the electromagnetic action. The tones of the instrument are said to resemble those of both stringed and wood equipment for orchestrial service, and the organ characteristics are reported to be perhaps the most beautiful of all. Less than one horsepower of electrical energy is required to operate the Choralcelo in full harmony.

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FOUNDED 1907 AS THE
PACIFIC LUMBERMAN, CONTRACTOR AND ELECTRICIAN

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High Voltage Transmission

There are but few transmission engineers in the Pacific Northwest who are not now interested in the problem of raising their line voltage. Some have already accomplished it, others are now in the throes of changing, and the rest are planning to do so. Eleven thousand volt lines are being raised to thirty-three, and twenty-five to sixty, the latter being so frequent as to be almost standard for long-distance transmission. The reason for this increase in line voltage is three-fold.

First and most pressing is the greater demand for power which has invariably resulted since the lines were built. This demand has often surpassed the most sanguine hopes of the projectors and exceeds even the reserve space planned for future expansion of generating capacity. Then again there is the recent improvement in high voltage equipment, especially high tension insulators and protective apparatus, whereas when many of these lines were installed it was not considered safe to use a voltage above twenty-five thousand. Lastly, and most potent, is the factor of cost, which increases with the voltage used. For an initial installation, through rough country, and intended to supply a consumption yet to be created, the lower voltage is cheaper. As the market is developed and the demand increases, it is found more economical to use the same line conductors and the same poles by raising the voltage, than it would be to construct a new line.

New generators are installed in plant vacancies to use surplus power at a tithe of the original unit cost. In many cases the transformers were originally wound so as to be connected for half voltage until the load became great enough to require full voltage. In other cases the transformation is effected by changing from delta to star connection.

This raise in voltage is contrary to the usual Eastern practice which holds continuity of service to be of paramount importance. But as all the great hydro-electric systems in the Northwest are equipped with steam auxiliary for peak and emergency load the reliability factor is counter-balanced by the more serious item of cost. It is a far different undertaking to construct a line with limited capital to an undeveloped market than it is through a well-settled country offering a safe return upon the investment. In a pioneer railroad installation double track and Pullman cars are not the first matters to be considered. The question of dollars outweighs the features of theoretical engineering perfection.

The problem of minimizing cost is further complicated by the ever-threatening competition from duplicating systems. While these occasionally redound temporarily to the benefit of the consumer, too often they are conceived by unscrupulous promoters who raise false hopes in a confiding investor. Experience has shown that in a community where the power consumption is necessarily limited the only possible result of such duplication is the absorption of the weaker and a consequent increase in rate to pay the interest on the double investment. Ultimately these fiascos intimidate the investor and hinder worthy projects which must thus suffer from the misdeeds and demerits of others.

A TRIBUTE TO THE MEMORY OF GEORGE P. LOW.

In the death of George P. Low the electrical fraternity has lost one of its most able writers and a man of many sterling qualities.

To no one man is due more credit for the exploitation of the western development in electrical lines than to the late Mr. Low. Dating back to the first electrical publication of the West, The Pacific Lumberman, Contractor and Electrician, George P. Low was the associate editor and his early writings will stand as a valuable contribution to history of hydro-electrical science. He it was who gave to the world the first detailed description of the high tension transmission problems that were at that time being solved.

His friends were many and his acquaintance legion and not one of whom today but feels the personal loss.

For many years Mr. Low occupied the position of electrical engineer for the Underwriters' Fire Association. He was prominently connected with the Pacific Coast Gas Association as its historian, and was at the time of his death president of the Pacific Coast Transmission Association, and had been connected for some time with A. M. Hunt of San Francisco.

George P. Low.

Sidney Sprout, a well known electrical engineer of San Francisco was associated with Mr. Low during the past years and has written the following little tribute to his memory:

"In the demise of George P. Low I feel that one of our number has passed to the beyond who will be missed more than any among us and that the western country has lost a man who will more than any other call up thoughts of the past.

It was in the year of the Mid-winter Fair, 1894, that I first met Mr. Low, and being an eastern engineer coming to this western country amongst strangers, the hearty welcome he extended me will never be forgotten and when I afterward learned the effort it would have been for another person I appreciated the fact that I had met one of the greatest characters in my profession—one of the most generous, charitable, brilliant and most popular friends I ever had the good fortune to meet. This feeling was verified later through my connection with him during the early history of the Board of Fire Underwriters, the "Pacific Lumberman," the "Journal of Electricity, Power and Gas," the Transmission Association and the engineering of the old Pacific Power Company and San Rafatel Gas and Electric Company and the several large fire losses of lighting and power stations where we sat together on appraising boards.

I say generous, as none ever came to him in need that he was not extended the best that could be given, and many times have I seen him leave his work to assist some one looking for work, encouragement, information or sympathy.

He was a brilliant writer and those who have read his interesting articles in the "Journal of Electricity, Power and Gas," and the eastern electrical publications know full well the debt of gratitude the Pacific Coast owes him for placing on record and incorporating in history the early work of the western engineers in the pioneer days of electrical development.

It is a matter of record among his many friends that we were unable to show our appreciation of his good work during his life time and that in his efforts to make the light of others shine his own was apparently hidden beneath the bushel, although it is certain that his light will shine long after he is gone."

PERSONALS.

Robert J. Thompson, manager of the Welsbach Company at San Francisco, left this week for an Eastern trip.

Phil Levy of the Levy Electric Company, San Francisco, left on May 22d for a trip East which he expects will cover two months or more.

C. C. Hillis, manager of the San Francisco house of the Electric Appliance Company, left for a trip to Chicago and the East on June 2d.

G. I. Kinney, manager of the San Francisco office of the Fort Wayne Electric Works, left on Jnne 4th for an outing of a week or two in the country in search of a much needed rest.

H. P. B. O'Dogherty, formerly manager of the San Jose & Santa Clara Railroad Company, has been appointed manager of the Central California Traction Company, which operates the electric line between Lodi and Stockton, Cal.

B. N. Atkins of Eugene, Ore., has been elected manager of the electrical department of the Walla Walla Valley Traction Company, and George D. O'Conner of Walla Walla has been made manager of the railway department of the company.

C. H. Johnson of the San Francisco office of the Western Electric Company has returned from a trip to Los Angeles. While there he took a little outing to Catalina Island with J. C. Kirkpatrick, president of the National Pole Company of Escanaba, Mich., and reports a catch of 34 fish aggregating 1,000 pounds during the two days of their visit.

Dow S. Smith, formerly general superintendent of the Brooklyn (N. Y.) Rapid Transit Company, has been elected vice-president of the Panhandle Electric Railway & Power Company, Spokane, Wash., which he and his associates have organized to develop a hydro-electric plant on the Priest River in Idaho and build a thirty-mile standard gauge electric railway from Priest River to Coolin, Idaho.

T. E. Bibbins, Assistant General Manager of the General Electric Company of the Pacific Coast returned on May 31st from a four weeks' trip through the East. He verifies the report received in San Francisco to the effect that he was the winner of the cup in the golf tournament of sales managers of the General Electric Company, held during the conference of that company at Pittsfield, Mass.

The many friends of John H. Dale, President of the Dale Company, New York, will regret to hear that he is now confined to his home as the result of a severe attack of pneumonia. The extent of Mr. Dale's interest and association with the electrical business will be appreciated when it is known that the convention of the National Electric Light Association which has been held during the past week at Atlantic City will be the first he has failed to attend in nineteen years.

ANNUAL PICNIC OF THE ELECTRICAL CONTRACTORS.

Chester A. Sayles, the Umpire.

On May 29th all of the San Francisco Electrical Contractors with their numerous friends and families journeyed to Fairfax Park, a beautiful spot across the bay from San Francisco, where the entire day and part of the night was spent in an old-fashioned picnic with dancing, baseball matches and various contests of skill participated in by man and woman and child.

The morning was given up to general visiting and renewing of old friendships and the making of new. The real fun began in the afternoon when the music arrived and the dancing was started in the outdoor pavilion.

During the morning a baseball game between the Oakland and San Francisco contractors attracted a great deal of attention and was won by the Oakland contingent by a score of 13 to 8. In the afternoon a picked nine from both teams of the contractors played a picked nine of electrical jobbers with disastrous results to the latter, the score being 28 to 7 in favor of the contractors. The jobbers' team was made up entirely of captains and every captain was a star of the first magnitude. Their class of play was, however, of too high a grade for the contractors to understand and the contractors went right along and played old fashioned ball and won.

Chester A. Sayles of the John R. Cole Company umpired to the entire satisfaction of every one but the losers.

Cox, Second Base for Contractors, at Bat and Captain Loughborough, Jobber, Catching.

The entire affair was a most enjoyable one and everybody had a good time. The outing was in charge of the following joint committee and its members are entitled to great credit for the success with which the program was carried out: W. S. Hanbridge, C. E. Wiggin, P. Decker, L. R. Boynton, W. W. Hainscom.

PICNIC NOTES.

"Jack" Heyer of the San Francisco City Electrical Department was one of the guests.

Following the picnic a small and select party had a very merry supper at Sanguinetti's.

Cox, Pitcher for the Contractors.

"Bob" Martland and Peter Murman, former contractors, were present, just as if nothing had ever happened.

There was no hammer-throwing contest and rumors that such a contest was won by John R. Cole are, therefore, untrue.

Jenkins, Contractor, Catching. Captain Hickox, Jobbers, at Bat.

The Oakland ball players were fortunate in having a fair rooter on the grounds who certainly did a great deal to win the game for them. She had a first-class "rooting voice" and her "Go it, you Gene!" could be heard for miles.

F. H. Poss looked natty and attractive in a blue suit with stripes running up and down and a straw sailor hat. He was

entered for the middle-weight woman's race, but the committee barred him at the last minute.

For a few minutes it looked as if there would be no ball game. Captain Goodwin of the jobbers made a protest against the contractors playing with spiked shoes, but after talking it over with Captain Woodward—also of the jobbers—it was decided to waive the point.

John G. Sutton and Geo. A. Cole Discussing the Proper Channels for the Distribution of Electrical Supplies.

During an intermission in the dancing, R. D. Holabird was called upon for a song and gracefully responded by singing "Dearie." Mr. Holabird is the possessor of a romantic tenor voice of great range, particularly adapted to picnics. He was accompanied on the piano by Herr Frosch.

Finish of Women's Race.

During the afternoon some very exciting running races took place with the following results:

Men's Heavyweight—Carlson first, Butte and Collins tie, second.

Women's Middleweight—Mrs. T. W. West first, Mrs. Booth second.

Men's Lightweight, J. H. Scott first, W. Burns second.

Women's Lightweight—Miss Clair Steinbring first, Miss Ida Finklestein second.

Boys—Ross West.

Girls—Emma Reimann first, Madeline Steinbring and Marion Wiggins tie, second.

Baby Boys—Robert Martland Jr. first, Edwin G. Davis second.

Every one in attendance received a numbered ticket on entering the gate and during the afternoon the duplicates were drawn from a hat in the Dancing Pavilion. There were eleven gate prizes and the winning numbers were as follows:

15, 137, 119, 448, 177, 163, 469, 500, 97, 13, 405.

The holders of these numbers are requested to notify W. W. Hanscom, Grant Building, San Francisco, to that effect.

TRADE NOTES.

The San Francisco office of the Paraffine Paint Company has been moved from the Merchants' Exchange Building to 34 First Street.

The additions to the Hawthorne, Ill., plant of the Western Electric Company are being pushed ahead and will be complete this summer. These additions and improvements allow for a considerable expansion for the telephone end of the company's business.

The Dean Electric Company of Elyria, Ohio, report the sale to the West Shore Telephone Company, Lemoyne, Pa., of a 500-line common battery multiple exchange complete. The order includes power and terminal apparatus and will be installed immediately.

At the West Allis Works of the Allis-Chalmers Company there is great activity in the gas engine building line, as a result of recent orders crowding close upon others received since the first of the year, the units for which are now being assembled for shipment.

The Western Electric Works of Portland, Ore., is carrying on its business in part of the new brick building which is rapidly taking the place of the ancient frame structure at Sixth and Ankeny, and will move into their former location as soon as the building is completed.

In our issue of May 29th we included an item in reference to sales of the Allis-Chalmers Company during March and April of this year in which we cited the aggregate of apparatus as 61,985 h. p. We desire to correct these figures and to call attention to the fact that the aggregate of sales reached the enormous capacity of 161,985 h. p.

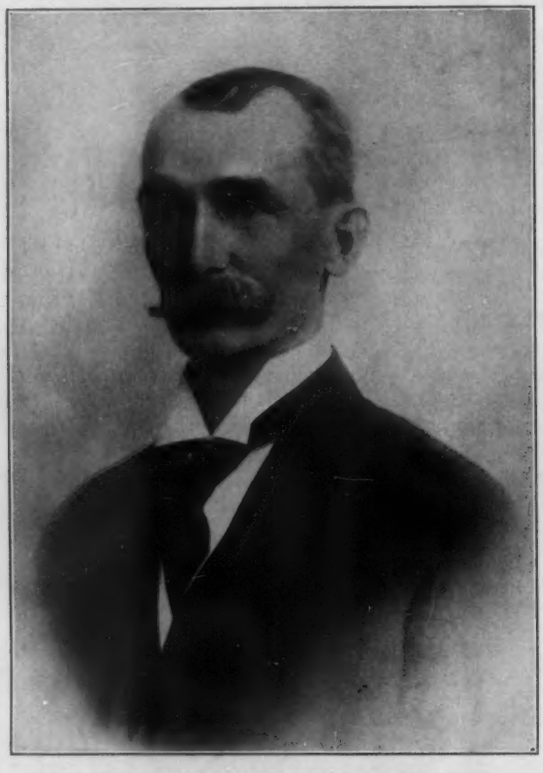
L. E. Baker, formerly with the American Steel & Wire Company, and J. E. Shedden, formerly with the Bradley Engineering Company, have formed a partnership and will act as engineers' agents for handling mining, sawmill and irrigating machinery at Spokane, Wash. The firm is also acting as consulting engineers and designers of complete plants. Later a machinery business will be established and a stock carried. The company has opened up offices at 615 Jamieson Building.

The Bliss Electric Company, Inc., operating the Tungsten Guarantee Company, has been organized for the transaction of business at 215 University Street, Seattle, Wash., capitalized at $25,000, with the object of conducting a general electric supply, fixture and specialty business. Their place of business is located in the center of the retail district of Seattle and it is their intention to cover the entire Northwest territory. The organization of this company was promoted by F. U. Bliss who for the past two and a half years has been associated with the Seattle-Tacoma Power Company at Seattle as Purchasing Agent and previous to his connection with that company was with the Idaho Consolidated Power Company of Pocatello, Idaho.

MAYOR WILL OPEN MACHINERY EXHIBIT.

National Association, Stationary Engineers, to Conduct Show at Convention.

Mayor Taylor is to press the button which will set in operation the machinery in the exhibition to be held in the Auditorium the week of June 14th in connection with the sixth annual State convention of the National Association of Stationary Engineers. Dr. Rader will deliver the invocation at 2 o'clock the afternoon of the opening day, and then Mayor Taylor will start the machinery.



Fred J. Fischer, National President.

The machinery manufacturers and merchants are manifesting much interest in the coming exhibition and are eagerly seeking space in the Auditorium for their exhibits. Of the 15,000 square feet available, more than 11,000 has been sold and paid for, while the demands that are still being made indicate that the entire floor space will be filled before the opening of the exhibition.

Flags, bunting and streamers will be used to decorate the interior of the building, and hundreds of incandescent lights will add to the brilliancy of the scene at night. A band of twenty musicians will play afternoon and evening throughout the week.

The convention to be held in connection with the exhibit will last three days. H. D. Saville, the State president, has arranged for the presence of Fred J. Fischer, the national president, at the convention. There will be a number of lectures by prominent engineers and professors each evening. They will be free to the public.

The meeting of San Francisco No. 1, N. A. S. E., held Thursday, May 27th, was occupied disposing of business incidental to removal to a new hall at 134 Fulton street and details of the smoker and reunion to be held there on June 10th.

The convention committee reports matters concerning the big convention and mechanics' fair to be opened at the Auditorium June 14th to be progressing finely. The near approach of the opening date brings a vast number of details for attention, but the energy and care displayed by the committee of arrangements is sufficient assurance that everything will be in order for a prompt and successful opening of the exhibition.

Under educational topics, Bro. Maher gave an interesting explanation of alternating current apparatus, particularly as regards "frequency" and its bearing on the application of alternating currents of different frequency to power systems.

H. D. Saville, State President.

Bro. Bonney talked on the question of determining the horsepower of gas engines, and the power required to drive air and ammonia compressors.

A. T. PEERY, Secretary.

THE CALIFORNIA STATE ASSOCIATION, N. A. S. E.

The California State Association was formed in response to a desire of the Engineers of the State to meet together, exchange ideas and promote their general welfare on a broader basis than they had before enjoyed.

The great underlying purpose of the N. A. S. E. is the education of its members in the science of steam engineering and its allied industries, and the inculcation of those things which tend to elevate the individual as men and citizens.

The first convention was held in this city in 1904, and since that time San Francisco has been destroyed and rebuilt and the better to show to delegates and visitors the marvelous progress that has been made in the rebuilding of the city a mechanical exhibit similar to the old Mechanics' Fair has been arranged in the Auditorium at Page and Fillmore streets, which will be open to the public during convention week, June 14th to 19th, inclusive.

The local committee and members have worked tirelessly for the success of this event and their motto is, BOOST the N. A. S. E., BOOST for SAN FRANCISCO.

INDUSTRIAL

A NEW FLAT IRON.

The General Elec'ric Company has lately brought out a new flat iron, the heating unit of which is new both in material, construction and shape.

The resistance metal used is named by its patentees, "Calorite," and is capable of withstanding oxidation to a point several hundred degrees hotter than any metal previously used in heating devices, its melting point being 2370 degrees F. The resistance of "Calorite" is twice that of nickel-silver and seventy-three times that of copper and it is this high specific resistance which enables it to be used in a single thin grid-layer or leaf. In the majority of designs, the heat must either pass through two or more

G. E. Flatiron—Top of Iron.

layers of heat insulation or radiate through an insulating air space. The "Calorite" leaf unit has such close thermal relation to the working surface of the iron that it cannot overheat. This construction obviously precludes the use of any auxiliary protective device to insure the life of the heating unit.

In the new iron the heat is evenly distributed over the entire working surface. A scorch proof shows that this is practically as well as theoretically true. The toe, the heel and both sides are heated equally providing for efficien' ironing in any direction.

G E. Flatiron—Base of Iron.

The construction of the iron is very simple and rugged. The body is of two hard gray cast iron plates held together by two heavy steel bolts. The thin leaf unit is firmly clamped between these plates and separated from them only by a sheet of clear amber mica two thousandths of an inch thick which provides the necessary insulation.

The shell cover, held by one bolt, carries a well made handle riveted to it, a continuous air jacket being formed between this shell cover and the working part of the iron. This insulating air jacket not only covers the top of the iron but the sides and ends as well, and the use of the objectional asbestos is eliminated.

The attachments are of the most approved design and are made of unbreakable material, the use of porcelain being entirely avoided. The leaf unit flat iron will be equipped with plain attaching plug, with combination indicating switch plug or with permanently attached cord, if desired.

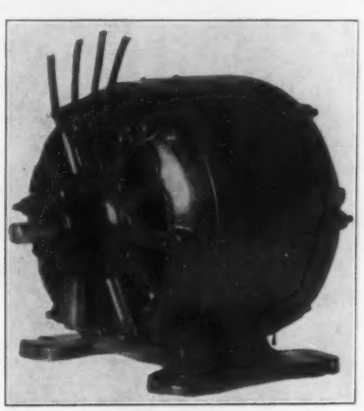
The few parts of the new General Electric iron are readily interchanegable and the iron can be completely disassembled by removing three bolts.

G. E. Flatiron—Calorite Heating Unit.

The new leaf unit iron is available in the five-pound, or 450 watt size, and the six-pound, or 550 watt size. The iron is finished in highly polished nickel.

WESTINGHOUSE TYPE DA ALTERNATING CURRENT MOTORS.

The advent of thoroughly prac'ical and satisfactory small electric motors is revolutionizing the me'hods connected with modern living. Shrewd inventors were first to see the possibilities for these wonderful little labor savers and have already applied them to machines for performing many tasks formerly done laboriously by hand. Almost any process that must be performed repeatedly with little or no variation can be done successfully and much more economically by a motor driven mechanical device than by any other means. Electric motors in small sizes are rapidly passing from the class of luxuries into the class of necessities, and it is safe to say that within a few years small mo'or driven machines will be doing the larger part of the routine work in homes, hotels, restaurants, offices, stores, shops, factories, etc.



Westinghouse Type D.A. Motor.

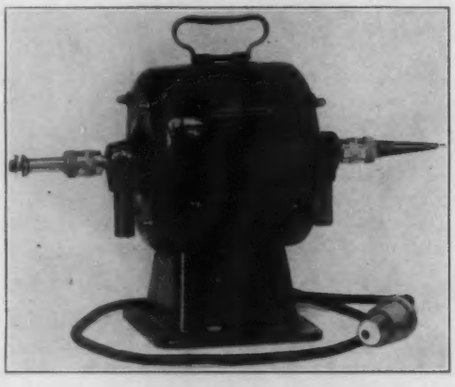
Great convenience is chief among the advantages of Westinghouse type DA motors. They can be located in almost any place where alternating current is supplied for electric lights and can be started and stopped as simply as turning an electric light on or off. A small motor driven device can be located with sole reference to the convenience of the work, the light, ventilation, etc., and with little regard to the source of power. An ordinary flexible lamp cord with a connection plug serves to conduct the motor current for the smaller sizes from any convenient lamp socket, and the whole device, even while operating, can be moved about the room, as in case of carpet cleaners.

Perfect safety to the operator, to the motor and to the material being handled or the work being done is assured. All conducting parts are effectually covered so that electric shock is practically impossible. All moving parts, except a portion of the shaft necessary for driving, are so covered and protected that clothing or material cannot be injured. The motors are clean and free from oil throwing or dripping, and the work is not soiled. They are so extremely simple that even the most inexperienced person can operate them successfully and safely.

Economy is also a consideration in favor of small motor operated devices. Most people are surprised at the extremely low cost of operating a small Westinghouse motor. Many devices, which do more work than a full grown person can do by hand, can be motor operated at a cost of not over one-half cent an hour. Moreover, current is taken only while the motor is operating, and the expense stops completely when the motor switch is opened.

The question of economy also extends to economy of space, which is sometimes an important matter. Motor operated devices occupy minimum space, and the output of a crowded shop or factory can be materially increased by substituting them for older methods of driving. This substitution can often be made in preference to enlarging the space.

In many a modern home the small motor has solved the servant problem either by making it possible to do without a servant or by making the work so pleasant and agreeable that good servants are glad to remain indefinitely. Small



Buffing, Polishing and Grinding Motor.

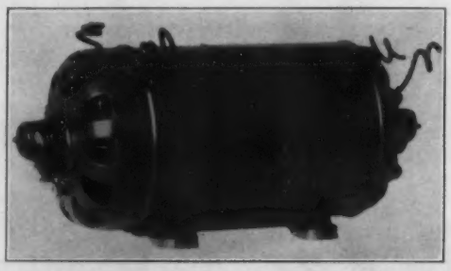
motors do the hard work, such as turning the washing machine and wringer, operating the carpet cleaner, floor polisher, dish washer, buffing and polishing wheels, etc. The sewing machine, a necessity in every household and formerly so trying to the strength of many housekeepers, can be operated with perfect satisfaction by a motor, and with practically no effort on the part of the operator except to guide the cloth.

The office man and banker have demonstrated to their entire satisfaction that motor driven machines will make mimeograph copies, fold the letters, seal and address the envelopes, stick the stamps, etc., much quicker and at less cost than it can be done by any other process, while at the same time registering the number of stamps used. Other machines will assort coins of different sizes, wrap them in packages of a given number each, and stamp the correct denomination and amount on the outside of the package. Motor driven adding machines also conduce to speed and accuracy.

Perhaps one of the most important of all the services rendered by small motors is that in which they add to human comfort by regulating temperature. Motor driven ventilating fans and blowers make living rooms more comfortable in summer by distributing cool air and in winter by distributing warm air. By their proper use in connection with the hot air heating system so much used in modern homes, a considerable saving in the cost of fuel can be effected, and the temperature throughout the rooms can be equalized.

Westinghouse type DA motors for single-phase alternating current circuits are extremely simple to operate. They are started and stopped by simply closing and opening an ordinary knife or snap switch. An occasional oiling is all the attention required under ordinary operating conditions during years of service.

These motors are built in capacities ranging from one-twentieth to one-fourth horse-power, voltage 110 and 220, and



Motor Generator for Charging Storage Batteries, Ringing Bells, Etc.

frequencies 25, 40, 50 and 60 cycles; some capacities are also built for 133 cycles.

These ratings are for continuous service. The speed is very nearly constant, that of the several sizes ranging between the limits, 1200 and 3400 revolutions per minute. By the intervention of suitable gears or pulleys the motors can be adapted to almost any service requiring power within their capacities.

NEW CATALOGUES.

Fairbanks, Morse & Co. have just issued a general catalogue covering the complete line of goods carried by that concern.

The Benjamin Electric Manufacturing Company, 151 New Montgomery Street, San Francisco, announce that new Tungsten Bulletin No. 4, dated June 1st is just off the press and ready for distribution. It contains the latest Benjamin designs in Tungsten fixtures and is a condensed reference book of rare value for practical in-door and out-door lighting purposes. Copies will be mailed on application.

The Western Electric Company is distributing in pamphlet form a reprint from the June, 1907, issue of "Power" of an article by F. G. Gaesche with the title "First Rateau Regenerator Installed in America." It covers in detail description and test of the Rateau low-pressure turbine system installed at the works of the International Harvester Company, Chicago, Ill., together with illustrations, diagrams and data of great value.

The Westinghouse Company's publishing department has recently issued a very tasty little booklet entitled "The Mission of the Westinghouse Electric Toaster Stove." It is 3"x4" in size, uniquely bound in covers made in imitation of toasted bread. The reading matter tells in a narrative way of the great convenience of this little device and offers numerous suggestions as to its use for the busy man and woman in the handling of the food problem.

The Ball and Wood Company of Elizabethport, N. J., have just issued a very handsomely printed brochure descriptive of the Rateau-Smoot Turbine and Generators which should be found of great interest to engineers and others concerned in development in the field of power production. Besides being an excellent example of the printer's art, it contains information of great value, including illustrations of the apparatus of which it treats, pressure diagrams and outline diagrams showing the details of construction.

VOICE VIBRATIONS.

The volume of transmission produced by any transmitter is largely dependent upon the diaphragm area that is exposed to the sound waves. Another factor is how great a proportion of the diaphragm is allowed to vibrate freely.

In all solid back transmitters heretofore manufactured, the diaphragm is insulated from the transmitter front by a soft rubber gasket. When new, this gasket allows the diaphragm to vibrate freely throughout its entire surface. But, unfortunately, no soft rubber has been produced that will not, to a greater or less extent, harden with age. Therefore, as soon as this hardening takes place the vibrating area is limited to that portion not enclosed by the gasket.

This surface is indicated by A, in Fig. 1.

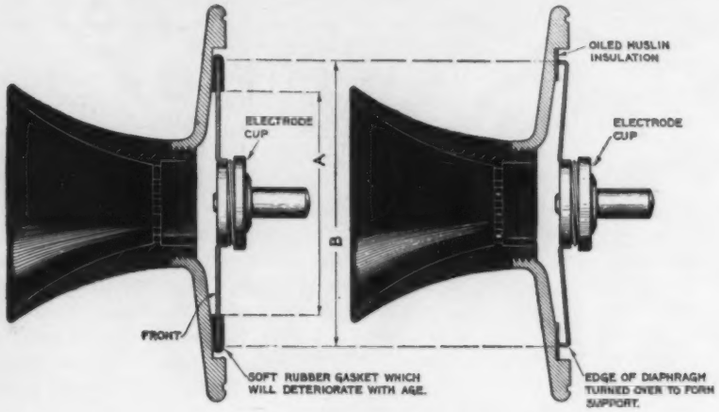


Fig. 1.

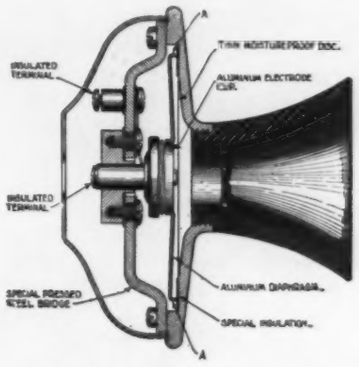


Fig. 2.

Furthermore, the hardening of the gasket contracts the rubber and throws the entire diaphragm out of adjustment. This deterioration often produces such a serious change that the surface of the electrode button does all the work that should be taken up by the entire diaphragm area. Then the deterioration of the gasket has a dampening effect upon the surface A.

To eliminate these opportunities for trouble, Wm. W. Dean, of the Dean Electric Company, Elyria, O., conceived the scheme of curling the edge of the diaphragm and insulating this part from the frame by a strip of oiled muslin. This material is as stable as steel and will stand an insulation test of 10,000 volts.

This produces the permanent vibrating surface B, Fig. 1, and since the voice vibrations strike the entire area, the volume of transmission is increased in proportion.

Another advantage of the substitution of muslin for rubber is the fact that the original adjustment remains permanent, since the muslin is practically indestructible. It is as permanent as the metal parts that compose the balance of the instrument.

In Fig. 2 and also in the right-hand portion of Fig. 1 it will be noticed that the newer diaphragm is cupped toward the front. This is done primarily to prevent any packing of the carbon particles in the electrode cup.

In operation these carbon granules become heated, and the heat is radiated into the diaphragm, which must expand. Because of the cupping of this diaphragm, it is impossible for it to expand in any other way than toward the mouthpiece of the instrument. This separates the front and back buttons of the electrode cup and absolutely prevents "packing."

This brings us to another point of excellence of the newer pattern as perfected by Mr. Dean; the new transmitter is self-regulating. It always gets the proper amount of current to give the highest grade of transmission regardless of the length of line of the voltage of the system. Furthermore, the consumption of power is reduced during the time the subscriber is listening, to two-thirds the amount required while talking.

This feature is of special advantage in local battery service where the voice current is furnished by dry cells. Even poor dry batteries will last longer and give a greater volume of transmission, during their entire life.

By again referring to Fig. 2, it will be noted that an arrow points to a line in the cross sectional drawing representing a thin moisture proof disk. This part seals the front of the transmitter and renders it absolutely moisture proof. This advantage is effected without decreasing the volume of transmission in any way. In fact, this feature serves to increase the sensitiveness of the diaphragm itself.

It should be noted that all of the parts in what is generally known as the Dean Indestructible Transmitter are constructed from non-deteriorating materials. The bridge holding the insulated terminals and the electrode button, is made of special pressed steel. A cast bridge is liable to shrinkage and breakage. The mouthpiece is also of steel drawn from cold metal. This is one of the latest Dean improvements that has just been marketed.

Possibly the most interesting feature of the new pattern is its simplicity. A comparison between it and the instruments manufactured before the introduction of competition in the telephone business, indicates how valuable competition has been to the industry at large. Readers familiar with early telephone work will remember the comparatively clumsy diaphragms that seemed to be constructed for no other purpose than to "buckle." Later on the adoption of carbon granule electrode chambers seemed conducive to very poor results through "packing." The absolute elimination of such difficulties and the many other advantages of competition are very gratifying indications of the advance in the art of manufacturing telephone equipment.

GAS EXPOSITION IN OAKLAND.

A very interesting exposition has been held during the past two weeks in the Arcade Building, corner Twentieth street and San Pablo avenue, Oakland, under the auspices of the Oakland Gas, Light and Heat Company.

The exposition included every device used in lighting, cooking and heating by gas, demonstrations being given during the exposition together with cooking lessons by experts in the handling of the gas range.

The booth of the Welsbach Company was particularly effective, as it included a complete installation of their various forms of mantle lights with a variety of designs in glassware and an actual demonstration of the consumption of gas with the Welsbach light as compared with the old type of open burner.

NEWS NOTES

INCORPORATIONS.

WALLA WALLA, WASH.—Washington Traction Company, $3,500,000; Gilbert Hunt and others.

PORTLAND, ORE.—Inland Oregon Electric Railroad Company, $10,000,000; Mark W. Gill and others.

SPOKANE, WASH.—Mosso-Berry Electrical Company of Spokane, $10,000, by H. L. Tinling, T. P. Mosso, F. O. Berry, and T. A. Allen.

SAN FRANCISCO, CAL.—Articles of incorporation of the Economic Gas Company of Santa Clara have been filed. The corporation is capitalized at $1,500,000. The directors are: D. O. Druffel, Henry P. Eberhard, and Nicholas Bowden.

NORTH YAKIMA, WASH.—The Eagle Valley Development Company is the name of a corporation organized to do mining, milling, irrigation, manufacture electric power, construct waterworks, pumping stations, light and power plants, etc., with capital stock of $40,000, by Owen Jones, Harry V. Bonniwell and Reuben L. Garrett.

SAN FRANCISCO, CAL.—Articles of incorporation of the Win Power Company have been filed. The company will deal in electricity, gas and water power. The directors are J. M. Agar, Ferdinand Butterfield and Mr. Lotspeich, the first two of San Francisco and the last named of Downieville. The corporation is capitalized at $499,800, of which $300 has been subscribed.

SALT LAKE CITY, UTAH.—The Independent Electric Company of this city, to deal generally in electric supplies; capitalization, $20,000, divided into 2000 shares of $10 each. Joseph F. Smith, Jr., president; Heber C. Iverson, vice-president; Lon J. Haddock, secretary; E. Chandler, treasurer; Oscar G. Hemenway, George C. Smith, W. N. Williams and R. S. Siddoway, additional directors.

FINANCIAL.

ROSEBURG, ORE.—The City Council has sold the $35,000 bond issue to Douglas County Bank, at par.

McMINNVILLE, ORE.—A special election will be held this week for the voting of the $30,000 additional water and light bonds.

PORTALES, N. M.—An election for a $75,000 bond issue for municipal water and electric light plants was carried by a large majority.

LOS ANGELES, CAL.—Stockholders of the Alamitos Water Company have voted to issue bonds in the amount of $200,000 preliminary to enlarging the system.

SUNNYSIDE, WASH.—At the election on Saturday to decide whether bonds should be issued to meet the expense of water works and other improvements the vote stood 8 to 1 in favor of the bonds.

UNION, ORE.—The Council has passed an ordinance authorizing the issuance of bonds in the sum of $25,000 for putting in an electric light plant, and calling an election on August 16 to vote on the proposition.

COVINA, CAL.—The Covina Valley Gas Company, under re-organized management has succeeded in selling bonds to the extent of $50,000 and will immediately begin operations in extending lines to Glendora and Azusa.

NORTH YAKIMA, WASH.—The sum of $70,000 has been subscribed by the people of this county toward assisting the Yakima Valley Transportation Company in extending its electric lines into various valleys around the city.

HILLSBORO, ORE.—The City Council has accepted the offer of a company of capitalists for the purchase of the city water and light plant for $15,500 and a 25-year franchise was granted. C. E. Lytle of this city is one of the promoters.

TUCSON, ARIZ.—A company headed by John Mets of Tucson has purchased a controlling interest in water works system of Benson and has purchased also the Benson gas works. The company will soon install an electric lighting plant.

PALO ALTO, CAL.—The Palo Alto bond election last week, which involved several propositions to increase the bonded debt of the town, resulted in the passage of three propositions and the defeat of four. The one that carried by the largest vote was the proposition to acquire and construct an automatic fire-alarm system at a cost of $3,500. The other two successful proposals were, first, to establish a modern street lighting system at a cost of $3,500, and second, to expend $7,000 in constructing a water-tank for the municipal and lighting plant.

MADERA, CAL.—The municipal water and sewer bonds have been sold by the city trustees to G. G. Blymeyer & Co., of San Francisco, at a premium of $7350. James H. Adams & Co. of Los Angeles bid $7434, but their bid was conditional upon everything being correct and subject to the approval of their attorney. The advertisement called for an unconditional bid and as Blymeyer & Co.'s bid complied with the request they were given the bonds. The other bidders were: N. W. Halsey & Co., $6,577.50; J. C. Wilson, sewer bonds, $2,507.50; Barroll & Co., $6,705; W. R. Staats & Co., $6,604.

TRANSPORTATION.

ESTACADA, ORE.—The Portland Railway, Light & Power Company has decided to erect a new depot here.

WALLA WALLA, WASH.—The County Commissioners will, on June 8th, hear the petition of the Walla Walla Valley Traction Company for the construction and maintenance of an electric line on Yellow Hawk avenue.

LOS ANGELES, CAL.—The City Council has passed Ordinance No. 208, granting to M. J. Nolan a franchise for the construction and maintenance of an electric railway along a portion of Washington street in this county.

SAN BERNARDINO, CAL.—The City Council, on request of Attorney J. W. Stephenson in the matter of a franchise for an electric railway into the N. W. residence district, was laid over two or three weeks to give the traction people an opportunity to meet with the petitioners.

LOS ANGELES, CAL.—The City Council has passed Ordinance 206 granting to P. Janss the right to construct and for a period of 20 years to maintain a single or double track railway along Stephenson avenue and Whittier Road in the county of Los Angeles.

TACOMA, WASH.—Dibble & Hawthorne, railway contractors, Bank of Commerce Building, Tacoma, have been awarded the contract for double tracking and relaying the tracks of the Pacific Traction Company for the street car lines on paved streets in this city. The cost will be $45,000.

FRESNO, CAL.—There was only one tender offering a cash bonus for the advertised franchise of the Hanford-Fresno and Summit Lake Interurban Railway covering connecting links across the county roads on the proposed line of the electric road. That bid was F. S. Granger's and the franchise was granted to him.

CITY OF MEXICO, MEX.—Locating Engineer A. V. Nesbitt of the Dr. F. S. Pearson's railroad, and other interests, has left Mexico City for Amecameca, where he will meet a party of engineers to make final surveys for a proposed electric railroad from Mexico City to Pueblo.

MEDFORD, ORE.—H. H. Harris of the Butte Falls Lumber Company will leave for Portland and the East next week, when he will order materials for the construction of the proposed electric line of the company from Medford to Butte Falls. The survey is completed and work is to begin at once.

TACOMA, WASH.—The Pacific Traction Company's experiment of laying street car rails on the concrete base of the street paving has failed to work and the track on the paved streets is now being torn up by Dibble and Hawthorne to put in ties. The experiment cost $25,000 and the track has been down less than two years.

ASTORIA, ORE.—The Astoria Electric Company has elected the following directors: E. C. Mitchell, S. S. Gordon, G. C. Flavel, R. C. Prael, artin Foard, F. C. Sykes and J. D. Mortimer, E. G. Mitchell was elected president; S. S. Gordon, vice-president and D. F. McGeer, secretary. The matter of extending the service and improving and overhauling the system was decided on. The line will be extended to near Hammond mill and the whole system placed in first-class condition. Over $40,000 will be spent.

PORTLAND, ORE.—Several hundred thousand dollars will be expended by the Oregon Electric Company on its present lines and on extensions during the year. Officials of the constructing, operating and engineering departments of the road are making a tour over the lines, preparatory to laying out the work to be undertaken. Members of the party were not inclined to talk, but enough could be learned to make it apparent that the expenditure of a large sum of money, probably $1,000,000 or more, was assured.

SACRAMENTO, CAL.—Actual construction work was commenced by the Sacramento and Sierra Railway this week at Orangevale, Sacramento County, when 20 teams with plows and scrapers were put to work under the direction of Engineer Graham. More teams will be put to work at that point and at other points between Sacramento and Lake Tahoe in a few days, and the work now started will continue until the railroad is completed through the timber belt in El Dorado County, which it is being built to tap. The road is financed by C. A. Smith and other millionaire lumbermen, and it has been making all its preliminary arrangements quietly and systematically. Land has been acquired in Sacramento for the location of factories at which the materials from the forests of yellow pine and sugar pine in the Sierra will be worked up into various finished products.

TRANSMISSION.

WENATCHEE, WASH.—The Council has granted a franchise to the Entiat Power Company. Power must be delivered in the city by December, 1909.

SPRINGFIELD, ORE.—The McKenzie Valley Irrigation & Power Company was granted a franchise to furnish electric power and light for a period of 50 years.

BELLINGHAM, WASH.—The Skagit Power Company has been granted a 50-year franchise by the government and will erect a 60,000 h. p. plant in the reserve on the Skagit River.

OROVILLE, WASH.—A. M. Dewey has started a crew of surveyors to laying out a site for a power house, dam and canal. The site is on the Similkameen River seven miles northwest of here and 3000 horsepower will be developed.

SUMPTER, ORE.—The Fremont Power Company is preparing to raise its Olive lake dam 25 feet, which will clearly double the capacity of the reservoir. Work will commence as soon as conditions at that altitude will permit. Right of way for the transmission lines will be cleared this summer.

LOS ANGELES, CAL.—The Copper Queen Mining Company is preparing to double the capacity of the electric plant at its mines near Copper Creek, Ariz. Another 300 horsepower engine will be installed.

RED BLUFF, CAL.—County Surveyor W. F. Luning has filed on 12,000 inches of the water in Mill Creek to be diverted in township 27, North, Range 2 East and used to generate electric power. The ditch will be 20 feet wide on top and 14 feet on the bottom and six foot deep. The flume will be 12 feet wide with sides seven feet high.

HAWTHORNE, NEV.—An electric power project has been financed by leading men of this camp and a syndicate has already purchased a chain of lakes emptying into Lavining and Rush creeks, near Mono Lake, Cal., 30 miles from Bowie. The work of constructing a power plant will be rushed. J. S. Cain, Johnnie Miller, J. E. Adams and others of St. Louis are behind the project.

FRESNO, CAL.—A. G. Wishon, with a party of engineers, including A. E. Balch, F. S. Newman, William Storrow and others from the southern part of the State, have gone to the mountains to inspect the site of proposed improvements and enlargements of the proposed improvements of the power plant on the San Joaquin. The proposed enlargements include the construction of a large dam, and a great increase of the plant.

SANTA BARBARA, CAL.—The Board of Public Works is receiving sealed bids for two 6-inch rough square casing sewerage pumps fitted with two-passage sewerage impellors, two 15-horsepower 1200 revolutions per minute 60-cycle General Electric induction motor 220 volts, 2 automatic starting compensators for 3-phase system of General Electric Company, each compensator being accompanied with single pole float-switch copper ball float with extended road, pulleys and chain.

SACRAMENTO, CAL.—The Sacramento Valley Power Company has been organized to take over the property of the Northern Light and Shasta Power Companies, consisting of plant on South Cow Creek (2000 horsepower) and plant on Snow Creek (1600 horsepower), with transmission lines extending to Redding, Shasta County, California. Additional water rights (10,000 undeveloped horsepower for the system) have been purchased and plans are now being prepared to extend the transmission lines.

SAN FRANCISCO, CAL.—W. H. Dohrmann, formerly auditor of the Hotel St. Francis, returned last week from Chihuahua, Mexico, where he is general manager of a large power system, on his way to New York to confer with experts upon the best way of increasing the capacity of the different plants under his control. At present the three plants of which Dohrmann has charge are producing about 2,000 kilowatts of electricity, but he says that the country is developing so rapidly and there is such a demand at present for power that he can find sale for twice that amount of energy in a very short time.

SAN FRANCISCO, CAL.—Louis T. Samuels and Louis Friedlander have leased the building to be erected on the north line of Sutter street, 68 feet west of Stockton, to the Metropolitan Light and Power Company for five years on private terms. This section seems to be particularly favored by the public service corporations. There are now in the immediate neighborhood the San Francisco Gas and Electric Company, Spring Valley Water Company, City Electric Company, Pacific States Telephone & Telegraph Company, Metropolitan Light and Power Company, Home Telephone Company and Pacific Gas and Electric Company.

ILLUMINATION.

UPLAND, CAL.—J. R. Anderson has secured a franchise for a gas plant.

KAMLOOPS, B. C.—The proposition to install an electric light plant was carried at the recent election.

AUBURN, CAL.—Wm. Mayer contemplates installing an electric plant for lighting and other domestic purposes.

SEATTLE, WASH.—The Council has passed a resolution providing for the installation of cluster lights along Union and Pike streets.

LAFAYETTE, ORE.—The City Council has granted a franchise to the Lafayette Light & Water Co. to supply this place with electric lights.

DOWNEY, CAL.—J. R. Gordon, proprietor of the Downey Light, Power and Water Company, will commence work at once on extension of his line to Rivera.

EL CENTRO, CAL.—Work is to be begun next week on the plant of the Imperial Valley Gas Company, which is to be located here. W. F. Holt is backing the enterprise.

REDWOOD CITY, CAL.—The United Gas & Electric Company has been granted permission to lay gas mains on Franklin street from Jefferson to Madison and on Madison Street to the county road.

LOS ANGELES, CAL.—The Board of Public Works is receiving sealed bids for furnishing the city four 20 horsepower and four 10 horsepower direct current motors in accordance with specification No. 73 on file with the board.

HERMISTON, ORE.—The City Council is considering a proposition from the Rose City Electric Construction Company of Portland, for a 20-year franchise for an electric light and power plant in this city to cost in the neighborhood of $15,000.

LOS ANGELES, CAL.—The Janss Investment Company intends to furnish electricity for lighting purposes in the section just east of Indiana street. The company is now supplying residents of this section with water and plans to use the surplus power developed at its water plant to generate electricity.

CENTRAL CITY, NEB.—A move is on foot to submit the question of voting bonds for a municipal electric lighting plant in Central City, and there is every indication that the measure will carry. The town is at present lighted by a gasoline plant, which gives good service, but there is a demand for electric lights.

CHEHALIS, WASH.—The MacArthur Gas and Power Company is the name of the company that will be formed in Tenino during the week for the purpose of developing the gas apparatus MacArthur has invented to manufacture gas. It is the intention of the company to put in a big plant in Tenino to manufacture the machinery necessary for installing plants of this kind.

HOLLY, COLO.—An electric lighting system of the latest pattern with arc lights and numerous incandescents will be installed in Holly in the next thirty days. The City Council so agreed, and the order for all the material, amounting to nearly $5000, was given to the Western Electric Company. The generator will be applied to the water pump from the water works, consequently Holly's electric light supply will be a most inexpensive luxury.

MOUNTAINHOME, IDAHO.—Seymour H. Bell has arrived from Portland and has purchased the local electric light plant at sheriff's sale. He states that the plant will be fully repaired and placed in running order at once. An expert armature winder will go over the plant carefully and if the present machinery cannot be put in first class condition, a new one will be ordered and shipped at once.

WATERWORKS.

LEAVENWORTH, WASH.—The Tumwater Light & Water Company will build a power line to Peshastin for pumping purposes.

SAN DIEGO, CAL.—The Council has adopted ordinances providing for the laying of water pipes in Hamilton and State streets.

COTTONWOOD, IDAHO.—A contract has been let to the Fairbanks, Morse Company by the Cottonwood Water Company for a pumping plant and 6,000 feet of water pipe.

LOS ANGELES, CAL.—The Council has authorized the Board of Public Works to purchase a steam shovel to cost $8,000 for acqueduct work on the Owens River system.

LOS ANGELES, CAL.—The Board of Public Works is receiving sealed bids for furnishing materials and supplies consisting of steel ribs for tunnel forms in accordance with specification No. 168B on file with the Board.

CHICO, CAL.—The Chico Water Suppy Company has recognized the growth of Chico and the demand for increased service. Work has been started on a well at the corner of Fourth and Locust streets, South Chico, to supply better service in that suburb.

YERINGTON, NEV.—F. W. Fairbanks returned from Reno to San Farncisco last week with the news that the city of Yerington was practically assured of a water system. A company has been organized in Reno with J. E. Gignoux as president, H. W. Huskey, vice-president and secretary, and Fred Stadtmuller, treasurer. The company will build waterworks here.

OAKLAND, CAL.—The Niles Water Company has asked for permission to lay a water pipe in the streets of Niles, beginning near Valley Hills and ending at the western end of the town. The Spring Valley Water Company has asked to withdraw its application and bonds filed in October, 1908, for permission to lay a pipe line along the county road from Pleasanton to Sunol, on the ground that it had made arrangements for a private right of way.

OIL.

SACRAMENTO, CAL.—A branch plant of the Union Oil Company to distribute not only for Northern California but for the State of Nevada is to be established in Sacramento. The company has purchased eight acres in the southern limits of the city and will erect works there. It also plans to operate its own line of river steamers between here and San Francisco.

BAKERSFIELD, CAL.—A large number of prominent independent oil producers attended the stockholders meeting of the Kern River and Coalinga Independent Oil Agencies last week and ratified the proposition formulated recently to build a pipe line from Bakersfield and Coalinga to tide water. L. P. St. Clair, president of the Independent Producers' Agency; S. W. Morsehear, president of the Coalinga Agency; H. H. Welsh of Fresno and M. V. McQuigg of Los Angeles, who are members of the agencies' executive committee, were given power to go ahead with the work. The securing of right of way, making surveys, etc., will begin forthwith, and it is expected to begin work by August 1, 1909. The estimated cost of the pipe line is $3,000,000, and the independent Transportation Company, with a capital of $10,000,000, of which $7,500,000 will be paid in, will probably be organized at once. By the contract with the Associated, which the Independents now have, the Associated handles daily 16,000 barrels of oil, leaving a surplus of 8,000 barrels of crude oil. By contract the Associated has to store the Kern River surplus in its storage tanks, while at Coalinga no provision is made for the surplus. The agencies therefore voted to have steel storage tanks built at Coalinga for this surplus, which is estimated at 3,500 barrels daily. These tanks, costing hundreds of thousands of dollars will later be taken over by the new pipe line company.